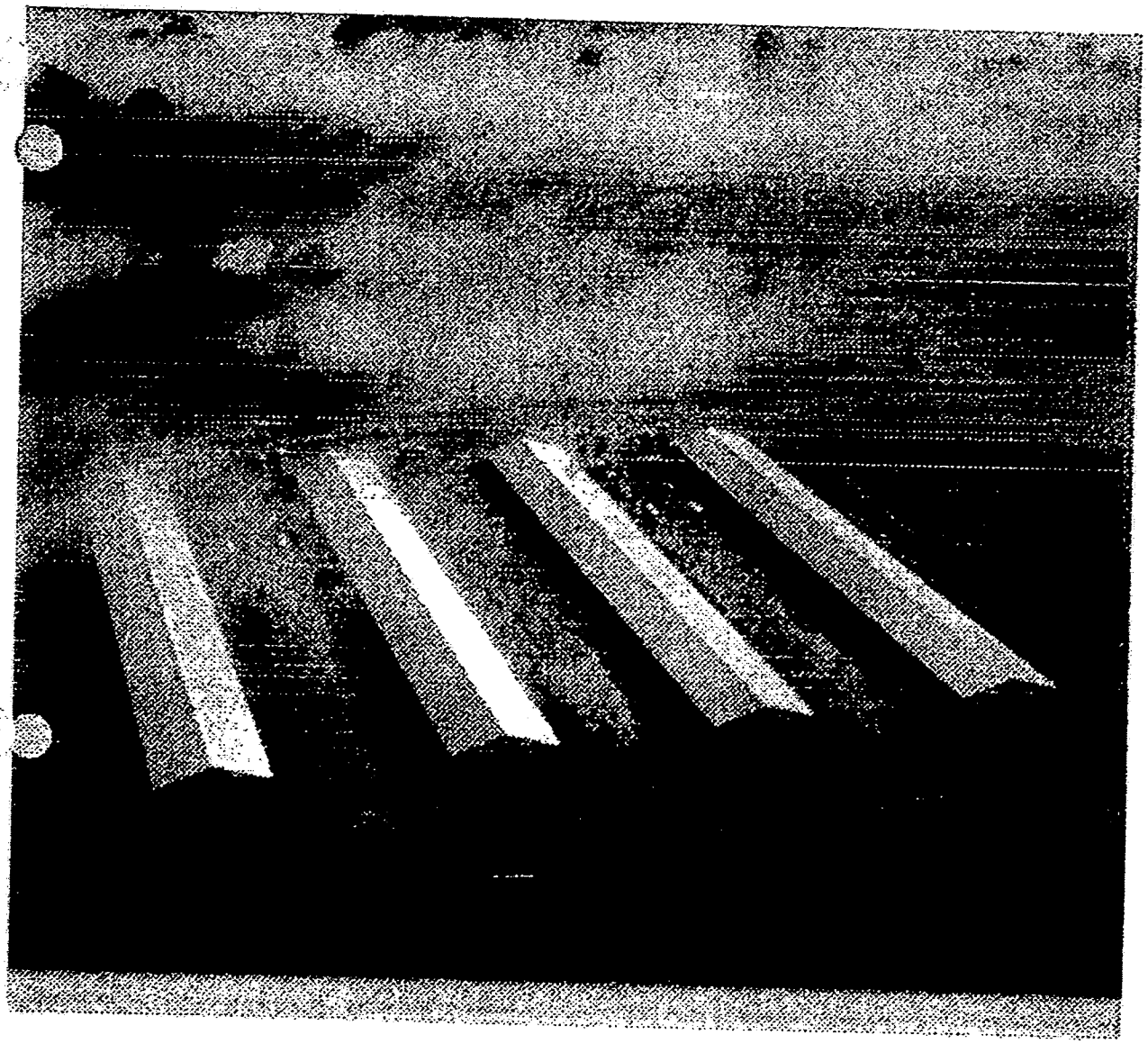

Tyson

Environmental Poultry Farm Management

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INTRODUCTION

INTRODUCTION

Tyson has been in the poultry business for almost 70 years. Over this time, the company has become one of the most recognized brands for quality chicken products. We contract with approximately 7,000 independent contract poultry producers (producers) in 19 states that raise the birds that go into our products. Growing chickens for Tyson is a source of income for family farms that would otherwise have to depend only on the financial ups and downs of other crops. We are enabling people to remain on the family farm who might otherwise be forced off by economic pressures.

Tyson has a long-standing commitment to protecting the environment wherever we have operations. Tyson's commitment to the environment also extends to encouraging independent producers to be good stewards of the land that they depend on for their living. Tyson strongly recommends that producers implement conservation measures such as Nutrient Management Plans and Best Management Practices.

The following manual is designed to provide information to producers about recommended environmental farm management practices. Tyson requires its producers to comply with all applicable federal, state and local laws, rules, regulations, and ordinances including, but not limited to, all those governing environmental and poultry litter management. The producer makes the daily decisions that determine environmental quality and compliance with applicable requirements. Because the producer is responsible for on-farm environmental issues such as bird mortality and litter management, Tyson provides this guide for reference. This information is provided to encourage the producer to be a good steward of the land and to protect natural resources.

POULTRY FARM ENVIRONMENTAL MANAGEMENT

POULTRY FARM ENVIRONMENTAL MANAGEMENT

Tyson remains committed to protecting natural resources wherever it has operations. This commitment applies to our processing plants, hatcheries, feed mills and company owned and operated farms. Tyson also encourages producers to meet and even exceed governmental regulations concerning poultry production. Federal and state governments have adopted or in the process of updating regulations regarding poultry farms. These new regulations on poultry farms are much more restrictive than regulations in the past.

The following recommendations outline activities necessary for compliance with state and federal environmental regulations and also necessary for demonstrating a commitment to environmental stewardship. If a producer is subject to any federal, state or local regulation, those environmental regulations take precedence over these recommendations and must be complied with.

Nutrient Management Plan

EPA and state regulations now require all Concentrated Animal Feeding Operations or CAFOs to maintain a Nutrient Management Plan (NMP) for on-farm litter handling and land application practices. The new EPA regulations require that litter application rates be based primarily on phosphorous concentration in the litter and phosphorous nutrient needs of the application area crops or grasses. Furthermore, states may develop new regulations that will require a NMP for farms that are not defined as CAFOs (see federal regulation section for CAFO definition).

Tyson strongly recommends that all producers maintain a NMP at the farm and for all land application areas owned or under their control. Upon request, personnel at the local office of the Natural Resources Conservation Service (NRCS) can prepare a NMP for producers. Also, representatives from the local Soil & Water Conservation District, Cooperative Extension Service or similar agency may have the authority to prepare a NMP. To meet the demand of producer requests for a NMP, several states are developing certification programs to enable private individuals or third parties to prepare NMPs for poultry producers.

The NMP should be updated whenever there has been a significant change in the operation. The state in which the farm is located may have specific requirements to determine when the NMP is to be updated. Producers need to be aware of these requirements and use established guidelines when considering changes to population numbers, Best Management Practices (BMP), litter handling and litter application practices. Producers should meet with the local NRCS, the agency or person that developed the NMP to prepare the five year update. Between the five year updates, producers should review the details of their NMP at least once per year.

Soil Samples

EPA's recent regulations require all CAFOs to collect and analyze soils from all litter application fields at least once every five years. State permit programs can require more frequent sampling. Producers must maintain awareness of state requirements. For more information on soil sampling, please see section 6.

Litter Samples

The regulations recently adopted by EPA require all CAFOs to collect and analyze a portion of their litter to be land applied. EPA states that annual sampling is the minimum frequency to provide litter nutrient concentration that can be used to establish a proper application rate. For more information on litter sampling, please see section 6.

Litter Application

It is recommended that litter be land applied immediately after its removal from the poultry houses. The preferred method of storage is a covered stack storage structure. Any litter stockpiled should be covered in a manner to prevent contact with precipitation. The bottom or base of the storage structure should be constructed of either concrete or impermeable clay. Temporary field stacks may be allowed, but these should be configured in a manner to prevent any contact with precipitation and run-off.

Buffer zones and vegetated filter strips should be implemented and maintained in all application areas. Actual buffer zones details or distances will vary by state. The producer's NMP should contain a detailed list of all buffer zone distance requirements. Many state or county governmental environmental agencies may have additional guidelines for producers to adopt. Further information is usually available at the local NRCS office or at the county Cooperative Extension Service office.

Producers should maintain litter application records detailing the volume, application rate, the acreage covered and the date of all litter applications. Poultry litter should only be applied on fields listed in the NMP. Producers should always record the location of land application sites or fields that receive litter. The permitting agency may require producers to maintain these records at their farm. Records should be available for review and be retained for a minimum of five years or on the frequency determined by the permitting agency.

Sale or Transfer of Dry Poultry Litter

For the sale or transfer of dry litter from the poultry farm to another person, the producer should supply the recipient with a copy of the most recent litter analysis. The producer should also maintain records of all sales or transfers of litter. These records should include the amount of litter that leaves the poultry farm, the date of the transfer or sale, and the name and address of the recipient and location of the application site. The producer should contact the permitting agency to determine if there are any regulations concerning litter transfers prior to removing litter.

Training

Producers should attend annual training programs on nutrient management, which Tyson will coordinate with the Natural Resources Conservation Service or a similar agency in your area. In most states, the local Cooperative Extension service has developed informational pamphlets that can help producers better manage litter application. The information includes Best Management Practices to be utilized for the most economical and practical use of their litter.

Mortality Management

Federal, state, and county dead bird disposal regulations are becoming more prevalent. Tyson encourages producers to minimize the impact of dead bird disposal through the utilization of Best Management Practices for the protection of the environment. It is the producer's responsibility to obtain information on the regulatory requirements to manage bird mortality and a possible catastrophic die-off. Producers should refer to section 10 for additional information.

FEDERAL REGULATIONS

FEDERAL REGULATIONS

On April 14, 2003, the US Environmental Protection Agency updated and revised the requirements for Concentrated Animal Feeding Operations (CAFOs) under the Clean Water Act. CAFOs will now be required to obtain a permit for continued operations. EPA's regulations went into effect on April 14, 2003.

The final regulations are posted at: http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm.

Additionally, EPA has published a document "Producers Compliance Guide for CAFOs". This document is posted at: http://cfpub.epa.gov/npdes/afo/compliance.cfm.

CAFO Definitions

The April 2003 regulations have been updated to incorporate many of the most recent advances in poultry production. EPA is now defining dry litter poultry farms with more than 125,000 broilers or 82,000 laying hens as large CAFOs. Also, farms that house more than 30,000 laying hens or broilers and utilize a liquid manure system will also be considered large CAFOs.

EPA has established a second category to define medium CAFOs. EPA has developed a two part definition to help a producer determine if their farm is a medium sized CAFO.

For a farm to be classified as a medium CAFO, both of the following must apply:

The bird population housed at the dry litter farm ranges between 37,500 and 124,999 broilers and for laying hens, the range is between 25,000 to 81,999 birds;

and

the farm discharges pollutants into waters of the US through a man-made device or pollutants are discharged directly into waters of the US which originate outside of and pass through the farm or come into direct contact with the birds.

The new EPA regulations also developed a third category to define a CAFO. The definition states that any animal production facility, regardless of its size, can be designated as a CAFO by EPA or a designated permitting authority.

Usually, farms that are designated as a CAFO have been determined to be a significant contributor of pollutants to waters of the US. An inspection of the facility by EPA or permitting authority must be conducted prior to designation as a CAFO. Also, if the permitting agency determines that the farm's discharge contributes to an impairment of down stream waters, already impaired for that pollutant, the farm could be designated as a CAFO.

Clean Water Act

All CAFOs are subject to and required to comply with EPA's new Clean Water Act (CWA) regulations, including the requirement to obtain a permit. The following information is a summary of the permitting program and the final regulations. The new regulations will apply to both the animal production area and to land application areas.

A CAFO is defined by the CWA as being a "point source" for the purposes of the National Pollutant Discharge Elimination System (NPDES) program. Point sources are required to obtain NPDES permit coverage. EPA has been authorized by the CWA to implement the NPDES permit program. EPA has since delegated the implementation of the NPDES permit program to a majority of states.

The NPDES program is then usually implemented and enforced by each state's respective environmental agency. Delegated states usually have a general permit for similar type point sources, such as CAFOs, to seek NPDES permit coverage. In the states that are not designated, the regional EPA office will be the permitting agency for the new CAFO regulations.

The April 2003 regulations require each delegated state and regional EPA office to issue new or revised NPDES permits that include all of EPA's CAFO regulations. States cannot implement regulations that are less stringent than those adopted by EPA, but can implement requirements that are more stringent. EPA has given the delegated states until April 2004 to revise their permitting programs or until April 2005 to amend state statutes to conform to federal requirements. In delegated states, the permitting agency is required by EPA to have a permit program in place to allow CAFO owners to begin applying for permit coverage by April 14, 2004.

According to EPA regulations, existing dry litter farms with more than 125,000 broilers or more than 82,000 layers will have until April 14, 2006 to obtain a NPDES permit. This deadline represents the latest date that an operation can apply for permit coverage. State permitting agencies, though, can set a permit deadline which can be earlier than the April 2006 date. Once the CAFO receives a NPDES permit, it must be kept "current" until the CAFO is closed and all litter removed according to state or federal provisions.

Permit Conditions

EPA's new regulations contain additional conditions that are to be incorporated in all state CAFO NPDES permits. These conditions include requirements that all CAFO's develop and implement a NMP, maintain on-farm records, manage the transfer of litter from the CAFO to other persons and submit an annual report. Because delegated states may issue more stringent regulations, all producers should contact their state permitting agency to obtain the most up-to-date information and to determine the specific details of the regulations. Those producers not in delegated states should contact the EPA regional office responsible for the state where the farm is located.

According to EPA regulations, all CAFOs must develop and implement a nutrient management plan (NMP) by December 31, 2006. After this date, any new CAFO seeking permit coverage must have a NMP in place when the permit is issued. For additional information please see section 7.

Permitted CAFOs must maintain records of management practices for the previous five years. The records include documentation of practices at both the production and land application areas. These records are to be kept on-site and made available to EPA or the state permitting agency upon request. A full discussion of record-keeping requirements follows in section 5.

New Source Poultry Operations

The April 2003 regulations also include requirements for CAFOs that are constructed after April 14, 2003. EPA refers to this type of farm as a "New Source." The regulations apply to new farms that will be defined as CAFOs once constructed and bird placement occurs. EPA defines a "New Source" as a CAFO constructed where no other CAFO is located. Also, a "New Source" CAFO can be defined as one that totally replaces an existing CAFO or one that is substantially independent of an existing CAFO.

EPA's regulations require new farms with bird populations greater than the CAFO threshold to apply or request permit coverage at least 180 days before beginning operations. New Source CAFO owners should submit their permit coverage application to their permitting agency. Furthermore, EPA is requiring all "New Source" CAFOs to have a Nutrient Management Plan in place at the time the farm commences operations.

Prior to beginning construction, a "New Source" CAFO owner should contact their permitting agency to determine all applicable requirements. State permitting agencies can set permit application deadlines and require additional conditions that are more stringent than those developed by EPA.

Expanding Poultry Operations

Existing poultry farms that increase the number of birds at their farm are also addressed in EPA's new regulations. Generally, dry litter poultry farms constructing additional houses which will contain more birds than the CAFO threshold number are not typically considered "New Sources."

EPA uses the following criteria to determine how an expanding farm will be defined at the beginning of operations. The first criteria to consider is whether the permitting agency where the farm is located had a CAFO permit program in place prior to April 14, 2003. A permit program would include a definition to help producers know if their existing farm is a CAFO. This would also allow an owner considering expansion to determine if the increase in bird population results in the farm being defined as a

CAFO. Based on this information, the owner could then determine whether permit coverage is required.

Prior to April 14, 2003, most states did not have a permit program to determine if a dry litter poultry farm was a CAFO. Since EPA's new regulations became effective, many existing poultry farms are now defined as CAFOs. EPA realized it could be confusing to have two different regulations: one for newly defined CAFOs, and one for those dry litter poultry farms that expand to CAFO size. Therefore, EPA new regulations indicate that, if a poultry farm expands to CAFO size in a state that did not have a method to define a CAFO prior to April 2003, the farm would be treated as if it where a newly defined CAFO.

EPA is also allowing newly defined CAFOs, existing prior to April 14, 2003, to have up to April 2006 to seek permit coverage. EPA realized it was problematic to allow existing dry litter poultry CAFOs up to three years to apply for permit coverage, but require expanding farms to seek coverage within a shorter time period. Thus, EPA will allow both existing CAFOs and farms expanding above the CAFO threshold to seek permit coverage within the same time period.

Although EPA has provided revised regulations, the actual determination of applicable standards may still be difficult. Also, the state can set permit application deadlines and require additional conditions that are more stringent than those developed by EPA. Prior to beginning an expansion project, the farm owner should contact their permitting agency to determine all applicable requirements.

STATE REGULATIONS

NUTRIENT MANAGEMENT

NUTRIENT MANAGEMENT

Poultry production has become one of the major agricultural endeavors in the US. Poultry producing areas are generally located in those parts of the country that are not conducive to traditional row crop agriculture. Examples of these areas include Northwest Arkansas, Northeast Alabama, Georgia and several regions within North Carolina, Virginia and Maryland. In some of these areas large scale poultry production has taken place since the early 1960's. The main use of poultry litter (poultry manure and bedding material) nutrients has been as a fertilizer for application to field crops and pasture grasses. The litter also provides organic material and serves as a soil amendment. This contrasts to commercial fertilizer that only provides nutrients when it is applied. While the litter has a proven fertilizer value; like any fertilizer, its use also presents the risk of over application.

Over the years, higher phosphorus levels have been noted in some application area soils. Excess phosphorous can be eroded from the soil and washed into nearby waterways. Higher concentrations of phosphorous in surface waters can result in creation of algal blooms. Poultry producers must utilize proper litter nutrient management practices to prevent nutrients from accumulating in soils. The two major nutrients found in poultry litter, nitrogen and phosphorous are essential crop nutrients but can present a risk to the environment if not managed responsibly. A discussion of these nutrients as well as information on nutrient management plans follows.

Nitrogen

Most of the nitrogen in fresh poultry manure is in the organic and urea forms. Once excreted, the organic nitrogen can be converted into ammonium, ammonia or nitrate forms by bacterial action or processes. These forms are then readily available for plant uptake. The urea nitrogen readily converts to ammonium and ammonia. The ammonium can also be transformed into nitrate nitrogen by bacterial action. Nitrate can then migrate through the soils and accumulate in groundwater. High levels of nitrate in drinking water can be harmful to human health, especially infants.

After land application, more bacteria and organisms are available in the soils to convert much of the remaining organic and urea nitrogen to ammonium nitrogen. The ammonium nitrogen also undergoes several phase changes. A portion is available for plant uptake, a second portion will volatilize directly to the atmosphere and a third portion will convert to nitrite and nitrate as a result of bacterial actions.

Phosphorous

Poultry manure has a high concentration of phosphorous when compared to the concentration of nitrogen. The phosphorous requirements of most plants are less than the nitrogen requirements. If application rates are calculated to meet the nitrogen nutrient requirements of most crops and pasture grasses, it is possible to land apply more phosphorus than is needed. Excess soil phosphorous could then be removed by runoff and transported to water sources.

Phosphorous in excreted poultry manure can be divided into two forms or types. The majority is excreted as organic phosphorous. The next largest concentration of phosphorous is the dissolved form. Within the poultry production house, the two phosphorous forms in the manure and organic bedding material together are referred to as "litter," and undergo little change. When litter is land applied, several phosphorous form changes will occur. Organic phosphorous can convert to soluble or dissolved phosphorous. The organic phosphorous can also convert to the attached form as soil particles are encountered. The soluble phosphorous form is readily available for plant uptake. Excess amounts of soluble phosphorous are also easily incorporated into precipitation and could leave the litter application area.

The attached form can result from the interaction between the phosphorous and minerals or particles in the soil. The phosphorous readily attaches to and forms strong bonds with trace minerals such as iron, aluminum and calcium present in the soil. Once these compounds are established, the phosphorous tends to remain bound to the soil particle and is usually not available for plant uptake.

Land Application

Land application is the most common and beneficial method to utilize the nutrients in poultry litter. Land application is relatively inexpensive and is environmentally beneficial when properly managed. The nutrients and organic material found in the litter provide a natural soil amendment. The litter can be used as a fertilizer that will provide valuable nutrients to increase the producer's grass or crop yields. By doing so, producers can benefit the environment by reducing the amount of commercial, inorganic fertilizers used at their farms. The litter is often viewed as commodity or a "bonus" by the producer. The litter can be used as an organic fertilizer or sold to neighboring land owners.

Poultry Nutrient Management

Many poultry producers apply litter as fertilizer to their pastures or croplands. To maximize the fertilizer benefits of the litter, producers should develop land application plans. Ideally, this should be completed before their litter is actually removed from the poultry house. Proper litter management incorporates the litter's nutrient content with the nutritional requirements of the crops in the application field. Comprehensive planning prior to litter application reduces the potential loss or waste of valuable nutrients. Nutrient management also minimizes adverse impacts that can result from over-application.

Poultry litter will lose a significant portion of its nitrogen compounds once it has been land applied. Soil incorporation shortly after litter application greatly reduces nutrient loss and reduces the potential for adverse impacts. Application of poultry litter to soils which are frozen or snow covered is usually prohibited. Litter application is normally not allowed during flood events or during times of high water table levels. The producer's nutrient management plan will likely include specific information for locations and times when litter is not to be land applied. Additionally, permitting agencies may have adopted setbacks distances or buffer zones for land application. Setbacks or buffers are specific distances from application sites to items such as water

sources, private dwellings, public roads and property lines. The state permitting agency should be contacted to determine all setback distances and buffer zones prior to application of litter.

Nutrient Management Plan Development

The Nutrient Management Plan (NMP) is an effective tool to both protect water quality and provide the producer with economic returns from poultry litter. To develop a NMP, the certified planner should first determine the nutrient requirements of the crop or pasture land to receive poultry litter. This should then be compared to the nutrient concentration of the litter. With this, the producer can determine the volume of litter that can be applied to meet crop needs.

Proper application rates provide adequate nutrients and also reduce potential water quality impacts due to nutrient run-off. Nutrient management plans calculate the total number of acres needed for land application of litter generated each year by the producer. This will allow the producer to then determine if the farm has sufficient application acres available or if a portion of the litter will need to be sold or transferred. Those landowners receiving or purchasing litter should also obtain a NMP for their land application acreage.

The Natural Resources Conservation Service (NRCS) has revised its technical guide, Conservation Practice Standard (Code 590) Nutrient Management, to include three methods that can be used to determine phosphorus application rates. Each method allows litter application rates to be based on nitrogen plant requirements. If the soil phosphorous levels are above an established level or concentration; however, nitrogen based application rates cannot be used. Instead, a phosphorous transport assessment or risk analysis is used to determine future litter application rates. Areas with soil that tests high for phosphorous or those sites with high risk factors for phosphorous run-off will likely have reduced litter application rates. The state NRCS offices are incorporating the federal guidance to develop state-specific guidance to determine phosphorous application rates. A copy of this conservation practice standard can be obtained at the local NRCS office or on the NRCS webs-site: http://www.nrcs.usda.gov/ .

The Phosphorus Index (PI) is one of the three methods listed in Technical Guide 590. This Index identifies and ranks litter application areas based on the risk of phosphorus movement. The Index considers factors or characteristics such as soil erosion rate, runoff, phosphorus soil test levels, commercial fertilizer and organic phosphorus application rates. The Index then incorporates these factors to assess the degree of vulnerability of phosphorus movement.

Producers should contact their local NRCS office or approved technical provider to request that a NMP be developed for proposed land application areas. Also, in some states, a certified technical service provider, certified crop advisor or licensed engineer may be available to prepare a NMP. Once the NMP has been implemented, it is recommended that producers review and update the plan for accuracy at least once every five years or on a frequency determined by the permitting agency. The NMP contains site-specific nutrient management plans for all application areas owned or under the control of the producer. Topographic maps and aerial photographs delineate all application sites. NRCS soil survey information of the application site's soil is included. Soil and litter sample analysis results are also included. Litter application rates are based on projected crop or forage yields. Buffer zones and setbacks will usually be marked on the topographic map and

aerial photographs. A list of Best Management Practices to be implemented at the farm is also part of the NMP.

Producers can also contact their permitting agency to determine if additional requirements or guidelines should be implemented. The producer's local office of the Cooperative Extension Service can provide beneficial information on a wide range of subjects concerning day-to-day operations. All producers should obtain a Nutrient Management Plan that will match litter application rates to meet plant nutritional requirements. Technical assistance and financial aid is available to help producers manage poultry litter applications. The NRCS and Cooperative Extension Service are two producer support agencies that can provide assistance.

SOIL AND LITTER SAMPLING

SOIL SAMPLING

Determining the nutrient concentration of a soil is a primary step for planning a litter Nutrient Management Plan (NMP). Soil sampling provides the producer with detailed information to determine if a particular soil is deficient of nutrients or whether over application is possible. Monitoring soils for phosphorous is a major responsibility for all poultry producers that utilize litter as a fertilizer or soil amendment. EPA regulations now require large poultry farms to analyze all land application soils for phosphorous. All litter application fields should ideally be sampled at least once every three years or on a frequency determined by the permitting agency.

Sampling Laboratory

Each state's Cooperative Extension Service will usually offer a soil testing program to producers. Depending on the state, the analysis could be performed at no charge. For other states, the Extension Service soil test charges may range from $10 to $20 per sample. The price will vary due to the number of parameters or items that are to be analyzed. Private testing laboratories can also be used.

The local county Extension Office or private lab should be contacted for information on how to collect a soil sample as well as analysis options. The Cooperative Extension Office can usually provide sampling instructions, information sheets and sampling bags or boxes. A basic soil analysis will test for several different items such as soil pH, nitrogen, phosphorous, potassium, calcium, magnesium, sodium, iron and conductivity.

Collecting Soil Samples

Properly collecting a sample is critical to ensuring that the analysis accurately reflects the nutritional and mineral value of the particular soil. Contact the local Cooperative Extension office or sampling laboratory prior to collecting soil for information on specific techniques required by the testing facility.

Sampling Time

The time of year that a sample is taken can produce different results. Soil nutrient concentrations vary due to the influences of rainfall, temperature and crop uptake. Producers should take soils samples at the same time of the year so the results are much easier to compare.

Soil Test Results

The laboratory that completed the analysis can usually provide written information and consultation to explain the results of the soil tests. Producers should contact the local Cooperative Extension Office for additional information and materials. Each state may have specific testing procedures that are different than neighboring states. Producers should make sure that any soil references used are specifically written for their state.

POULTRY LITTER SAMPLING

Determining the nutrient level of poultry litter is a primary component for the planner developing a nutrient management plan. Sampling provides detailed information on the nutrient concentration in the litter. A certified nutrient planner can then determine application rates to maximize crop uptake and prevent water quality impacts. Monitoring litter for phosphorous and nitrogen continues to be a major responsibility for all poultry producers. EPA regulations require CAFOs to analyze their litter for phosphorous and nitrogen each year. Also, producers need to be aware that their permitting agency can adopt regulations that require litter sampling more frequently. All sampling results are to be kept at the farm for five years. EPA regulations require CAFOs to give a copy of the litter nutrient analysis report to those individuals who purchase or are given litter from the farm.

Sampling Laboratory

The local Cooperative Extension Service is usually available to conduct analysis of poultry litter. Private testing laboratories can also be used. It is recommended that producers contact the sampling laboratory prior to actually collecting the sample. The sampling laboratory will usually provide information on how to collect the sample and other helpful information.

At a minimum, the litter should be sampled for nitrogen, phosphorous, and potassium. Most Cooperative Extension offices include the above elements and can also include calcium, pH, percent moisture and electrical conductivity in the analysis.

Sample Collection

The samples that provide the most accurate results are those of litter removed directly from the poultry house. Samples taken from stacking sheds or from compost bins will not contain the same nutrient concentrations. Regardless of the sampling location, the collected sample should be representative of the litter land applied. Properly collecting a sample is critical to ensuring that the analysis accurately reflects the nutritional and mineral value of the litter. Contact the local Cooperative Extension office or sampling laboratory prior to collecting litter for specific techniques required by the testing facility.

Sample Time

Most publications indicate that litter should be analyzed prior to land application. The nutrient concentration of the manure will allow the certified nutrient planner to accurately calculate litter application rates. The sampling results should be used to prepare and periodically update the Nutrient Management Plan. Cake litter samples should also be taken and analyzed prior to removal and application. Most publications also state that producers should deliver their litter samples to the testing laboratory as soon as possible.

Litter Test Results

The laboratory that completed the analysis can provide written information and consultation to explain the results of the litter tests. The sampling results usually include recommendations to further maximize nutrient usage. Producers should contact the local Cooperative Extension Office for additional information and materials. Each state may have specific testing procedures that are different than neighboring states. Producers should make sure that any litter references used are specifically written for the state in which the farm is located.

RECORDKEEPING

RECORDKEEPING

The following section applies to poultry farms that have obtained a NPDES permit or are required to maintain certain records. Both the EPA and state agencies have record keeping requirements. States can develop more stringent recordkeeping requirements than those of EPA and can require any size farm to maintain records. Producers should contact their respective permitting agency to determine their recordkeeping responsibilities. Regardless of government regulations, producers should develop a recordkeeping program for their facility. Many of the items listed below will assist poultry producers with litter usage and improve the operation and management of their farms.

Record-keeping Requirements

Permitted facilities will usually be required to maintain records of management practices for the previous five years. When requested, these records are to be made available to the permitting agency upon request. The records can include documentation of practices at both the production and the land application areas.

Production area records include information on the owner or operator of the farm, where it is located, the number and type of birds confined, available land application acres and the amount of litter generated. and the amount transferred each year. Also, the farm should maintain a topographic map that illustrates its location by latitude and longitude. Records for land application areas include litter application practices, conservation measures, the NMP and BMPs. The amount of litter land applied and transferred from the farm should also be recorded. Permitting agencies may also require operators to develop litter and soil sampling programs.

Examples of additional record keeping requirements for production and land application areas are detailed below.

Best Management Practices

Farms should maintain records concerning BMPs that are utilized at land application areas. One essential BMP that must be documented is the development and implementation of a NMP for all land application areas. Additionally, records should include BMPs required by the permitting agency. These practices can include ensuring adequate storage of poultry litter. proper mortality management, onsite chemical management, developing litter testing procedures and land application management.

Another BMP required by EPA is the use of setbacks and vegetated buffers around surface waters. No litter is to be land applied in these areas. EPA has established a setback distance of 100' and as an alternative, vegetated buffer distance of 35' around surface waters. The states are allowed to require the development of additional buffers and setbacks.

Nutrient Management Plan

The majority of the BMPs required by EPA can be satisfied through the development and implementation of a NMP. EPA also requires that a specific set of records concerning the management of land application activities be maintained at the farm. This list includes: (1) records of expected yields from application field crops; (2) date and method of land application; (3) weather conditions 24 hours before and after land application; (4) sampling methods for litter and soil analysis; (5) litter and soil test results; (6) litter application rates; and, (7) the actual amount of nitrogen and phosphorous applied.

Inspection Program

It is suggested that inspections be performed on daily and weekly intervals of the production areas of the farm. It is recommended that the producer conduct weekly inspections of any storm water diversion devices around the production area and record the results of the inspection. Additionally, the producer should conduct daily inspections of all drinking water and cooling water lines and record the results.

The producer should perform a weekly inspection of any litter storage structures. The results of the inspection should be documented. Records documenting the current design of any litter storage structure are also to be maintained at the facility. Further, farms are encouraged to develop a program to periodically inspect all land application equipment. The equipment should be in good working order. The date of each inspection should be documented. Corrective actions arising from all inspections are to be recorded and maintained on-site for five years. All deficiencies should be corrected as soon as possible.

Litter Transfers

EPA's new regulations will allow the transfer of litter from a poultry farm to other persons. The producer, however, must provide the recipient of the litter with a copy of the most recent nutrient analysis before transfer. Farm owners or operators must also record the date of litter transfer, name and address of the recipient and the approximate volume of litter transferred. Also, the location of the land application area must be documented.

Annual Report

The permitted facility is required to submit an annual report to the permitting agency that includes the following:

- the number and type of birds in the production houses;
- an estimate of total litter generated by the birds;
- the amount of litter transferred to other persons in the previous 12 months;
- a description of any discharge that occurred on the farm;

- the total number of land application acres listed in the NMP;
- the actual number of acres used for land application in the previous 12 months;
- the total number of the land application acres owned or controlled by the farm; and,
- a statement indicating if the current NMP was developed or approved by a certified nutrient management planner.

BEST MANAGEMENT PRACTICES

BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are guidelines helpful to poultry producers in the day-to-day management of their farms. These practices can help to protect the environment and allow the producer to gain full value of the litter that is sold or land-applied. The permitting agency may have a list of Best Management Practices that producers are to implement. Also, adopting BMPs may be a condition for permit compliance. Best Management Practices address areas such as litter handling practices, filter strips, soil and litter testing and record keeping. The following is a discussion of different management practices that are designed for poultry producers.

The Delaware Department of Agriculture has developed an extensive list of BMPs that producers should review.

Their website address follows: www.state.de.us/deptagri/nutrients/bmp.htm

Composting

Composting can be used to biologically stabilize fresh litter and dead birds into a beneficial soil amendment. Composting also reduces odor and the presence of flies. The use of composting can reduce the volume of litter. This reduction in the quantity of litter reduces producer hauling and spreading expenses.

Field and Riparian Buffer Zones

Buffer zones are vegetated strips that have been established at the edge of application sites. The buffer zones reduce erosion and any potential runoff of nutrients. The use of grass buffer strips or forest filter strips can protect water quality close to poultry farms and litter application fields. The vegetated strips act to filter and retain any excess nutrients from runoff. The buffers act to reduce the volume of nutrients from contacting nearby water sources.

Contact the local Natural Resources Conservation Service, Cooperative Extension Service, or other producer support agency for additional details.

Acceptable Best Management Practices

The following is a listing of Best Management Practices developed by the Texas Agricultural Extension Service.

1. All litter stockpiled or retained on site shall:
   a. be covered to prevent contact with precipitation;
   b. be placed on impermeable clay or concrete to prevent infiltration; and,
   c. be isolated from all run-off waters by dikes, terraces, berms, ditches or other structures.

2. Maintain grass filter or barrier strips between litter application fields and streams, lakes or other water sources.

3. Do not spread litter close to a water well, highway or neighboring property line.

4. Do not apply litter to land with excessive slope.

5. Soil test at least once every three years and maintain results.

6. Sample litter before application.

7. Cover trucks hauling litter more than one mile.

8. Do not apply litter to frozen or saturated soils or during rain or snowfall.

8. Do not apply litter to highly erodible lands.

9. Inform neighbors when you will be applying litter.

10. Apply litter early in the week. Avoid spreading on Fridays or during the weekend.

11. Maintain records:
    a. where litter was applied;
    b. application rate;
    c. when litter was applied and to what crop or forage grass;
    d. anyone who bought or was given litter; and
    e. location where litter will be applied.

Odor Control

The following table lists Best Management Practices to control poultry farm odors.

Poultry Farm Waste Management Odor Control Checklist:

Source	Cause	BMPs to Minimize Odor
Farmstead	Poultry Production	Vegetative or wooded buffers Recommended best management practices Good judgment and common sense
Ventilation	Volatile gases Dust	Fan maintenance Efficient air movement
Indoor surfaces	Dust	Vacuum and washdown between flocks.
Feeders	Feed spillage	Design, operate and maintain feed system to minimize accumulation of decaying wastage. Clean up spillage on a routine basis.
Feed storage	Decomposition of accumulated feed residues	Reduce moisture accumulation within and around immediate perimeter of feed storage by ensuring drainage is away from site and/or providing adequate containment. Clean up spillage on a routine basis.
Litter storage and handling areas	Decomposition of accumulated manure	Remove spillage on a regular basis. Provide for adequate drainage around manure stockpiles. Inspect for and remove or break up accumulated waste in filter strips around stockpiles and manure handling area as needed.
Dead birds	Carcass decomposition	Proper disposition of carcasses
Incinerators	Incomplete combustion	Secondary stack burners
Dead bird disposal pits	Carcass decomposition	Cover carcasses Proper location/construction of burial pits Disposal pit covers tight fitting
Standing water around facilities	Improper drainage Microbial decomposition of organic matter	Grade and landscape such that water drains away from facilities.
Mud tracked onto public roads from farm access	Poorly maintained access roads	Farm access road maintenance

(From the North Carolina "Dry Litter Poultry Handbook")

LITTER STORAGE STRUCTURES

LITTER STORAGE STRUCTURES

When poultry litter is removed from houses, it is not always possible to land apply immediately. Factors that delay litter application can include the time of the year, plant growing season, and inclement weather. Producers should store litter in areas that are not exposed to precipitation or contact runoff water. Proper storage will help to maintain the nutrient concentration of the litter and reduce the potential for water quality impacts.

Permanent Structures

A roofed structure is a preferred method to store litter prior to application. The roof height should be sufficient to allow movement by stacking equipment and should provide protection from rain blowing into the structure. The roof eliminates the introduction of excessive moisture which can lead to a reduction of nutrients. Such structures should have their foundations constructed from concrete or impermeable clay. These measures eliminate possible runoff and leaching to ground and surface waters.

The Natural Resources Conservation Service (NRCS) and Cooperative Extension Service may have plans available for the construction of litter storage units. The NRCS also provides some cost sharing programs to the producers to help with construction expenses.

Temporary Structures

Producers can use windrow or bunker type arrangements for temporary manure storage. The temporary structures should be covered to prevent contact with precipitation and with runoff waters. Plastic sheeting may be used as long as it is anchored against the wind. The storage area should be located on a higher area away from water sources. The producer should use berms to prevent runoff waters from contacting the litter. Filter strips should also be maintained around temporary structures to prevent nutrient runoff.

Preventing Fires in Storage Structure

Producers should be aware that litter storage structures have the potential for spontaneous combustion. Most fires result from the mixing of wet litter with dry litter or buildup of methane gas. Litter storage fires can be prevented through good management practices. Several suggested guidelines follow:

- keep the litter dry and away from the end of the barn;
- do not mix the wet cake with dry litter;
- do not cover moist litter, allow it to dry;
- limit stack height to less than 5 feet; and,
- stack internal temperature should not exceed 180 degrees F.

MORTALITY MANAGEMENT

MORTALITY MANAGEMENT

As a condition of contracting with Tyson, producers must properly manage mortality and dead bird disposal. Flock health can be jeopardized by diseases such as airsacculitis and gangrenous dermatitis if dead birds are not properly managed. Disposal methods can include rendering, composting, incineration, landfill and sometimes disposal pits. Regardless of the method used, producers should implement environmentally sound measures for dead bird disposal. If not properly disposed, dead birds can cause odor, water quality impacts, disease and insect and rodent problems.

Permitting agencies generally have regulations concerning disposal practices and methods. As a permit condition, producers may be required to implement an approved method of disposal. Producers should contact the permitting agency in the state where the farm is located for additional details concerning mortality management.

Rendering

Rendering is an excellent method for dead bird disposal. Almost 100% of the bird can be converted into alternative uses. Rendering also removes the dead birds from the area thereby eliminating the potential for adverse environmental impacts.

One issue to note when considering rendering is the condition of the carcasses when they are delivered to the rendering facility. Most of these facilities have specific guidelines for dead birds. The carcasses should be stored in a freezer or in a similar manner that reduces the rate of carcass decomposition. If such a method is not available, producers are usually required by the rendering company to deliver the birds within 24 hours of death. Producers should obtain guidance from the rendering facility prior to transporting dead birds.

Composting

Composting dead birds is another practical and economic method of disposal. This process allows for the dead birds, litter and other organic material to be mixed together. These items will then decompose into a product that can be used as a fertilizer or soil amendment. Depending on the producer's management practices, this process can be accomplished in just over one month.

To begin a compost operation, producers should first determine the size of the bins that are needed at the farm. The local Extension Office or NRCS offices usually have guidance publications to help producers determine the size of their compost facility. To determine bin dimensions, producers should consider their average mortality figures from previous years and also the size of the birds near the completion of the growing cycle. Regardless of the final size, it is important to note that at least two compost bins should be constructed. Two bins allow for a primary and secondary heating process and aeration of the material.

The bins are usually constructed of wood and are generally five feet in height. The volume of each bin should be sized on estimated farm mortality rates. The bins should also be sized to

allow easy access of compost-handling equipment. All compost buildings should be roofed to prevent precipitation from contacting the material. The roof should also be designed to prevent blowing rain from entering and contacting the compost piles. The floor of the unit should be made from concrete or similar material. The temperature of the compost material should be monitored in both the primary and secondary bins. Producers should purchase a thermometer whose probe will be able to reach the middle of the material stored in the bin. A thermometer up to three feet in length could be required depending on the size of the bin.

Moving the material from the first bin to the second allows mixing with the atmosphere. In the second bin, the material will go through a second heating process. The internal temperature of the material should again be monitored. As in the primary bin, the temperature in the second bin will spike and then begin to fall. The material should be removed from the second bin and placed inside a storage shed until final use. The material can be temporarily stored outside, but permitting agencies usually require the material be covered to prevent contact with both precipitation and runoff waters.

If the compost is to be land applied, the producer's Nutrient Management Plan should be updated to specify application rates and land application sites. The permitting agency should also be contacted to determine if any regulations exist to monitor or prohibit land application of compost.

Incineration

The use of incinerators is another method to dispose of dead birds. When propane or natural gas prices are low, the use of incinerators often increases. Fortunately, many of today's incineration units are highly efficient which offsets fuel price fluctuations.

Incinerators need to be carefully sited to reduce possible odor complaints. Poultry producers must address air quality issues such as odor and dust which can be generated by incineration. Further, a permit may be required for the operation of an incinerator. The producer should contact their permitting agency for regulatory advice associated with the use of an incinerator. Producers can contact a sales representative from one of the various incinerator manufacturers to help determine the appropriate size of the unit. Producers should consider their average mortality figures from previous years and also the size of the birds near the completion of the growing cycle. Poultry carcass mass does increase rather dramatically in the later weeks of the grow-out cycle and should be added to incinerator sizing calculations.

Incinerators are available with several different options. Producers should carefully review the various options to determine the unit that will best suit the farm. Units are available with single and dual burners. Others are available with automatic timers and ignition. These controls can reduce the amount of time needed to operate the incinerator, but additional preventative maintenance may be required to keep these units in working order.

The ash that results from incineration must be disposed of properly. There can be concentrations of phosphorous and potassium in the ash. Land application of the ash is allowed in

most states. Producers should consult their permitting agency to obtain information about requirements prior to any land application.

Catastrophic Poultry Mortality Loss

A catastrophic loss of poultry is something that could impact any producer regardless of management practices. Excessive mortalities could result from a loss of electricity on a hot summer afternoon, rainfall and wind from a hurricane, or tornado or an extremely heavy snowfall. While little can be done to prevent these tragedies, producers should develop a contingency plan to respond to such an event before it occurs.

The producer's permitting agency or Department of Agriculture should have in place a program to address catastrophic loss. The local office of the Extension Service or NRCS may have additional information and guidance. Most of these agencies also have specific disposal options that producers can utilize. Generally, these options include incineration, composting, rendering, landfill or on-farm burial. Most catastrophic disposal programs will require the producer to contact the appropriate agency to detail the reason for the loss and action taken to resolve the situation.

PRODUCER RESOURCE AGENCIES

PRODUCER RESOURCES

U.S. Poultry and Egg Association

-Dedicated to the growth of the entire poultry industry.

-Extensive programs allow members to remain informed of regulatory measures and technical advances made within the industry.

-U.S. Poultry and Egg Association
1530 Cooledge Road
Tucker, GA 30084
TEL: (770) 493-9401
FAX: (770) 493-9257

http://www.poultryegg.org/

Poultry Water Quality Consortium

-Encourages the use of poultry and poultry by-products as a resource.

-Promotes cooperation and information exchanges between government and industry on water quality issues.

- Poultry Water Quality Consortium
6100 Building Suite 4300
5720 Uptain Road
Chattanooga, TN 37411-5681
TEL: (423) 855-6470

http://www.poultryegg.org/PWQC/index.html

U.S. Environmental Protection Agency

Animal Feeding Operations

-Website developed for owners and operators of all types of animal feeding operations.

-Contains EPA regulations concerning all CAFOs.

-Contact: http://cfpub1.epa.gov/npdes/home.cfm?program_id=7

Non-Point Source Pollution

-Website provides producers with numerous publications and additional guidance material to manage runoff from agricultural activities.

-Contact: http://www.epa.gov/owow/nps/agriculture.html

Natural Resources Conservation Service

-Administers national soil and water conservation programs.

-Provides USDA leadership to assist landowners implementing resource conservation measures.

-Provides technical support to landowners considering items such as manure storage facilities, mortality disposal practices and nutrient management plans.

-Contact Washington, D.C. office: http://www.nrcs.usda.gov/

-Regional, state and local NRCS offices can usually be found in the local telephone directory or can be accessed at the following website: **http://www.nrcs.usda.gov/about/organization/regions.html**

Cooperative Extension Service

-Provides state specific research based information and technology to producers.

-Partnership with USDA and each states land grant university.

-Contact information is usually available in the local telephone directory.

DIRECTORY OF STATE AND NATIONAL POULTRY ASSOCIATIONS

Alabama Poultry and Egg Association
P. O. Box 240
Montgomery, AL 36101
TEL: (334) 265-APEA
FAX: (334) 265-0008
http://www.alabamapoultry.org

Arkansas Poultry Federation
321 South Victory Street
Little Rock, AR 72201
TEL: (501) 375-8131
http://www.thepoultryfederation.com/

Delmarva Poultry Industry, Inc (Delaware and Maryland)
16686 County Seat Hwy.
Georgetown, DE 19947-4881
TEL: (302) 856-9037
http://www.dpichicken.org/

Georgia Poultry Federation
P.O. Box 763
Oakwood, GA 30566
TEL: (770) 532-0473
FAX: (770) 532-7543

Indiana State Poultry Association
Purdue University
1151 Lilly Hall1026
West Lafayette, IN 47907-1151
TEL: (765) 494-8517
FAX: 765-496-1600
http://ag.ansc.purdue.edu/ispa/index.html

Kentucky Poultry Federation
P.O. Box 21829
Lexington, KY 40522-1829
TEL: (859) 266-8375
FAX: (859) 269-1303
www.kypoultry.org

Louisiana Poultry Federation
120 Ingram Hall
Louisiana State University
Baton Rouge, LA 70803
TEL: (225) 578-2219
FAX: (225) 578-1259

Mississippi Poultry Association
P.O. Box 13309
Jackson, MS 39236-3309
TEL: (601) 355-0248
FAX: (601) 353-3840

Missouri Poultry Federation
225 E. Capitol Ave.
Jefferson City, MO 65101
TEL: (573) 761-5610
http://www.thepoultryfederation.com/

North Carolina Poultry Federation
4020 Barrett Drive, Suite 102
Raleigh, NC 27609
TEL: (919) 783-8218
http://www.ncpoultry.org/

Oklahoma Poultry Federation
14 North East 48th St.
Oklahoma City, OK 73105
TEL: (405) 604-3350
http://www.thepoultryfederation.com/

Pennsylvania (PennAG Industries Association)
2215 Forest Hills Drive, Suite 39
Harrisburg, PA 17112
TEL: (717) 651-5920
FAX: (717) 651-5926
http://www.pennag.com/

South Carolina Poultry Federation
1921-A Pickens St.
Columbia, SC
TEL: (803) 779-4700
FAX: (803) 779-5002

Tennessee Egg and Poultry Association
926 Scepter Drive
Murfreesboro, TN 37129
TEL: (615) 890-1272
FAX: (615) 890-1272
http://www.tnpoultry.org/

Texas Poultry Federation
595 Round Rock West Dr. 305
Round Rock, Texas 78681
TEL: (512) 248-0600
FAX: (512) 248-0664
http://www.texaspoultry.org/

Virginia Poultry Federation
333 Neff Ave., Suite C
Harrisonburg, VA 22801-3430
TEL: (540) 433-2451
FAX: (540) 433-3256
http://www.vapoultry.com/

NATURAL RESOURCES CONSERVATION SERVICE

STATE OFFICES

Alabama NRCS Service Center Office
P.O. Box 311
Auburn, AL 36831-0311
TEL: (334) 887-4500
FAX (334) 887-4534

Arkansas NRCS State Office
State Office Complex
Arkansas State Office
700 W Capitol Ave Ste 3416
Little Rock, AR 72201-3215
TEL: (501) 301-3100

Delaware NRCS State Office
1203 College Park Dr Ste 101
Dover, DE 19904-8713
TEL: (302) 678-4160

Georgia NRCS State Office
355 E Hancock Ave
Athens, GA 30601-2775
TEL: (706) 546-2272
FAX: (706) 546-2120

Illinois NRCS State Office
2110 W Park Ct Suite A
Champaign, IL 61821-2986
TEL: (217) 353-6603
FAX: (217) 353-6676

Indiana NRCS State Office
6013 Lakeside Blvd
Indianapolis, IN 46278-1989
TEL: (317) 290-3200

Kentucky NRCS State Office
771 Corporate Dr Suite100
Lexington, KY 40503-5438
TEL: (859) 224-7350

Louisiana NRCS State Office
3737 Government St
Alexandria, LA 71302-3327
TEL: (318) 473-7751

Maryland NRCS State Office
339 Buschs Frontage Rd
Annapolis, MD 21401-5596
TEL: (410) 757-0681
FAX: (410) 757-0687

Mississippi NRCS State Office
100 W Capitol St Suite 1321
Jackson, MS 39269-1602
TEL: (601) 965-4182
FAX: (601) 965-4940

Missouri NRCS State Office
601 Business Loop 70 W Suite 250
Columbia, MO 65203-2546
TEL: (573) 876-0900

North Carolina NRCS State Office
4405 Bland Rd Suite 205
Raleigh, NC 27609-6293
TEL: (919) 873-2118
FAX: (919) 873-2190

Oklahoma NRCS State Office
100 USDA Ste 206
Stillwater, OK 74074-2651
TEL: (405) 742-1204
FAX: (405) 742-1201

Pennsylvania NRCS State Office
1 Credit Union Place
Harrisburg, PA 17110-2912
TEL: (717) 237-2222

South Carolina NRCS State Office
1835 Assembly St Suite 1007
Columbia, SC 29201-2448
TEL: (803) 765-5883

Tennessee NRCS State Office
675 US Courthouse
Nashville, TN 37203
TEL: (615) 277-2577
FAX: (615) 277-2531

Texas NRCS State Office
101 S Main St
Temple, TX 76501-7602
TEL: (254) 742-9800
FAX: (254) 742-9819 fax

Virginia NRCS State Office
1606 Santa Rosa Rd.
Richmond, VA 23229-5014
TEL: (804) 287-1500

West Virginia NRCS State Office
75 High St RM 301
Morgantown, WV 26505-7558
TEL: (304) 284-7548

COOPERATIVE EXTENSION SERVICE

STATE OFFICE CONTACTS

Alabama Cooperative Extension:

1) North Alabama District
P.O. Box 1088
Normal, AL 35762
TEL: (256) 858-4975
FAX: (256) 858-4976

2) East Alabama District
224 Duncan Hall Annex
Auburn University, AL 36849
TEL: (334) 844-5270
FAX: (334) 844-5276

3) South West Alabama
800 Alabama Avenue
Selma, AL 36701
TEL: (334) 875-3232
FAX: (334) 875-3234

Arkansas Cooperative Extension Service
University of Arkansas
Division of Agriculture
2301 South University Avenue
Little Rock, Arkansas 72204
TEL: (501) 671-2000
FAX: (501) 671-2209

Delaware Department of Agriculture
2320 S. Du Pont Hwy
Dover, DE 19901
TEL: (302) 698-4500
FAX: (302) 697-6287

Georgia Cooperative Extension Service
University of Georgia
College of Agricultural & Environmental Sciences
Conner Hall
Athens, GA
TEL: (706) 542-3924

Illinois Extension and Outreach
University of Illinois
214 Mumford Hall (MC-710)
1301 W. Gregory Dr.
Urbana, IL 61801
TEL: (217) 333-5900

Indiana Cooperative Extension Service
Purdue University
Agricultural Administration Building
615 W. State Street
West Lafayette, IN 47907-2053
TEL: (765) 494-8489
FAX: (765) 494-45876

Kentucky Cooperative Extension Service
College of Agriculture
University of Kentucky
S-107 Ag. Science Bldg.-North
Lexington, KY 40506
TEL: (859) 257-4302

Louisiana Cooperative Extension Service
LSU Agricultural Center
102 Efferson Hall
Baton Rouge, LA 70803
P.O. Box 25203
Baton Rouge, LA 70894-5203
TEL: (225) 578-6083

Maryland Cooperative Extension Service:
Eastern Shore
Wye Research and Education Center
P.O. Box 169
124 Wye Narrows Drive
Queenstown, MD 21658
TEL: 410-827-8056

Mississippi Cooperative Extension Service
Department of Agriculture and Biological Engineering
Box 9632
Mississippi State, MS 39762
TEL: (662) 325-3280
FAX (662) 325-3853

Missouri Cooperative Extension:

1) Central Missouri Region Office
530 Clark Hall
University of Missouri
Columbia, MO 65211
TEL: (573) 882-2695

2) Southwest Missouri Office
3003 E. Chestnut Expressway, Suite 200
Springfield, Missouri 65802
TEL: (417) 865-0707

North Carolina Cooperative Extension Service
College of Agriculture and Life Sciences
102 Ricks, Box 7602
North Carolina State University
Raleigh, NC 27695
TEL: (919) 515-2811

Oklahoma Cooperative Extension Service
139 Agriculture Hall
Oklahoma State University
Stillwater, Oklahoma 74078
TEL: (405) 744-5398
FAX: (405) 744-5339

Pennsylvania Cooperative Extension Service
College of Agricultural Sciences
217 Ag Admin
Penn State University
University Park, PA 16802
TEL: (814) 863-3438

South Carolina Cooperative Extension Service
103 Barre Hall
Clemson University
Clemson, SC 29634-0101
TEL: (864) 656-3382
FAX (864) 656-5819

Tennessee Cooperative Extension Service
2621 Morgan Circle
121 Morgan Hall
Knoxville, Tennessee 37996
TEL: (865) 974-7114
FAX: 865-974-1068

Texas Cooperative Extension Service
Williams Administration Bldg. Rm 112
College Station, TX 77843-7101
TEL: (979) 845-7800
FAX: (979) 845-9542

Virginia Cooperative Extension Service:

1) Southeast Region
Cooperative Extension Building
First Floor
Suite 107
P.O. Box 9400
Virginia State University
Petersburg, VA 23806
TEL: (804) 524-5252
FAX: (804) 524-5452

2) Central Region
P.O. Box 158
History Junction Shopping Center
Highway 460
Appomattox, VA 24522-0158
TEL: (434) 352-7114

3) Northwest Region
1316 East Main St., Suite C
Luray, VA 22835
TEL: (540) 743-2009
FAX: (540) 743-2014

4) Northern Region
70 Main Street
Suite 31
PO Box 701
Warrenton, VA 20188-0701
TEL: (540) 341-7961
FAX: (540) 347-2534

5) Northeast Region
11 South 12th Street
Suite 210
Richmond, VA 23219-4035
TEL: (804) 786-5802
FAX: 804-786-5815

West Virginia Cooperative Extension Service
507 Knapp Hall
Morgantown, WV 26506-6031
TEL: (304) 293-4221
FAX: (304) 293-6611

PERMITTING AGENCY CONTACTS

Alabama Department of Environmental Management
1400 Coliseum Blvd.
P.O. Box 301463
Montgomery, AL 36130-1463
TEL: (334) 271-7700

Arkansas:

1) Department of Environmental Quality
8001 National Drive
P.O. Box 8913
Little Rock, AR 72219
TEL: (501) 682-0744

2) Soil and Water Conservation Commission
101 East Capitol, Suite 350
Little Rock, Arkansas 72201
TEL: (501) 682-1611
FAX: (501) 682-3991

Delaware Department of Agriculture
2320 S. Du Pont Hwy
Dover, DE 19901
TEL: (302) 698-4500
FAX: (302) 697-6287

Georgia Environmental Protection Division
2 Martin Luther King Jr. Drive
Suite 1152 East Tower
Atlanta, Georgia 30334
TEL: (404) 657-5947
TEL: (888) 373-5947
FAX: (404) 651-5778

Illinois Environmental Protection Agency
Bureau of Water
Watershed Management Section
1021 N. Grand Avenue East
Springfield, IL 62794-9276
TEL: (217) 782-3362

Indiana Department of Environmental Management
100 N. Senate Ave
P.O. Box 6015
Indianapolis, IN 46206-6015
TEL: (800) 451-6027

Kentucky Natural Resources and Environmental Protection
500 Mero Street 5th Floor, CPT
Frankfort, KY 40601
TEL: (502) 564-3350
FAX: (502) 564-3354

Louisiana Department of Environmental Quality
P.O. Box 4313
Baton Rouge, La. 70821-4313
TEL: (225) 219-3296
FAX: (225) 219-3309

Maryland:

1) Department of the Environment
1800 Washington Blvd.
Baltimore, Maryland 21230
TEL: (800) 633-6101

2) Department of Agriculture
50 Harry S. Truman Parkway
Annapolis, MD
TEL: (410) 841-5700

Mississippi Department of Environmental Quality
P.O. Box 10385
Southport Center
2380 Highway 80 West
Jackson, MS 39204
TEL: (960) 961-5171

Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102
TEL: (800) 361-4827

North Carolina Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699
TEL: (919) 733-4984

Oklahoma:

1) Department of Agriculture
2800 N. Lincoln Blvd.
Oklahoma City, OK 73105-4298
TEL: (405) 521-3864

2) United States Environmental Protection Agency Region 6
1445 Ross Avenue Suite 1200
Dallas, TX 75202
TEL: (214) 655-6548

Pennsylvania Department of Environmental Protection
16th Floor, Rachel Carson State Office Building
P.O. Box 2063
Harrisburg, PA 17105-2063
TEL: (717) 787-4686

South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201
TEL: (803) 898-3432

Tennessee Department of Environment and Conservation
401 Church Street, 21st Floor
Nashville, TN 37243-0435
(615) 532-0104

Texas Commission on Environmental Quality
12100 Park 35 Circle
P.O. Box 13087
Austin, TX 78711-3087
TEL: (512) 239-1000

Virginia Department of Environmental Quality
629 East Main Street
P.O. Box 10009
Richmond, Virginia 23240-0009
TEL: (800) 592-5482

West Virginia Department of Environmental Protection
414 Summers Street
Charleston, WV 25301
TEL: (304) 558-2107

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IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA and OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT, in his capacity as the TRUSTEE FOR NATURAL RESOURCES FOR THE STATE OF OKLAHOMA,

Plaintiff,

vs. 4:05-CV-00329-TCK-SAJ

TYSON FOODS, INC., et al,

Defendants.

- -

VOLUME I OF THE VIDEOTAPED DEPOSITION OF INDRAJEET CHAUBEY, PhD, produced as a witness on behalf of the Plaintiff in the above styled and numbered cause, taken on the 27th day of January, 2009, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

A About 35 percent is forest. So that's about 90 percent, and rest are in other categories.

Q All right. Do you know what the approximate percentage of the urban area is in the Illinois River watershed? 09:28AM

A So it has to be less than 10 I would think. More like 6 or 7 percent; no more than that.

Q Based on your knowledge and skill and education, training and experience, including reading published literature, do you have an opinion what is the primary method used for poultry waste disposal? 09:28AM

MS. LONGWELL: Object to form.

A Yes.

Q What is that opinion? 09:28AM

A Land application, surface application of poultry litter.

Q All right. From your review of published literature, do you have any knowledge of approximately how long land application of poultry waste has occurred in the IRW? 09:29AM

MS. LONGWELL: Object to form.

A Can you ask that question again?

Q I will. From your review of literature or other sources, do you have knowledge of 09:29AM

approximately how long poultry waste has been generally land applied in the IRW?

MS. LONGWELL: I'm just going to state a continuing objection to the term waste. I think that's traditional, but that way I'm not going to continue to object just because you use that word. 09:29AM

MR. GARREN: All right.

A Yes.

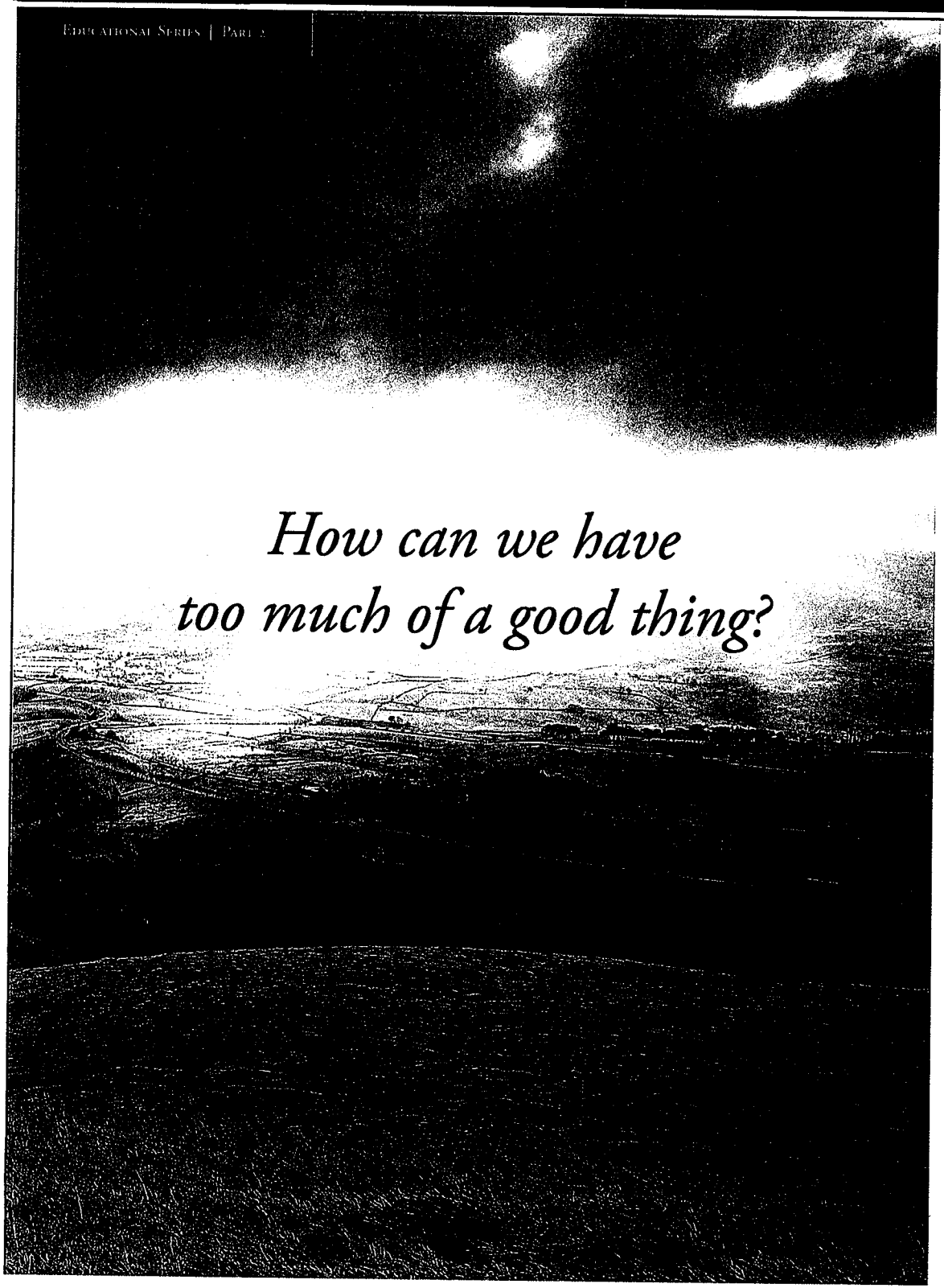
Q Approximately how long have you learned that would be? 09:29AM

A For a long time. I mean, since poultry industry has been concentrated in northwest Arkansas.

Q All right. When I use the term waste, let me maybe define that so that you and I have an understanding, too. I define waste as the excrement, the bedding material and things such as feathers or wasted feed and moisture that occurs that's taken out of the house at the conclusion of the growing session, sometimes commonly referred to as poultry litter in Arkansas. Do you know the term poultry litter? 09:29AM 09:30AM

A Yes.

Q And can you tell me what you understand the term poultry litter would mean? 09:30AM



How can we have too much of a good thing?

Lately, a good deal of concern has been raised about the effect of excess nutrients on the land and waters of Eastern Oklahoma.

So where do these nutrients come from?

Nutrients can come from many sources, one of which is the use of poultry litter as an organic fertilizer. However, many other man-made and natural sources contribute nutrients to our watersheds.

The 1.2 million cattle that graze in Eastern Oklahoma deposit a considerable amount of nutrients on the land and in our streams in the form of manure. (By comparison, a broiler chicken produces less than three ounces of manure a day; a grazing cow produces 60 pounds per day and there are no application guidelines for cattle farmers.)

Other sources of nutrients include commercial chemical fertilizers used for agriculture and lawns, plant nurseries, rural septic tanks and municipal waste treatment facilities. Even golf courses, if not run properly, contribute nutrients through the use of highly soluble commercial fertilizers.

In short, the sources of nutrients in our watershed are many.

Today in Oklahoma, only one of the above mentioned potential sources is regulated and monitored—The poultry industry.

We have recently proposed an extensive plan to address poultry-related nutrient management here in our Scenic River Watersheds. With the state's endorsement, we hope to move forward with this plan.

But a truly comprehensive plan of nutrient management must go beyond one industry and encompass all who contribute to nutrient buildup in our watersheds.

We are making a major effort in our industry to manage nutrients. Now we encourage everyone who has a stake in our land and our waters to join us.

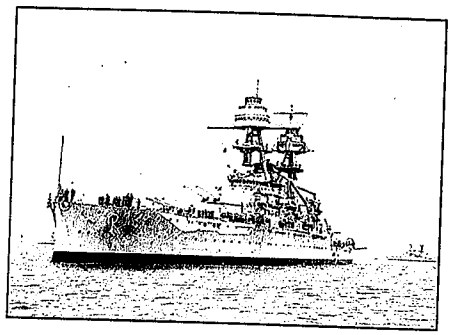
Peterson Farms · George's · Tyson · Simmons · Cargill

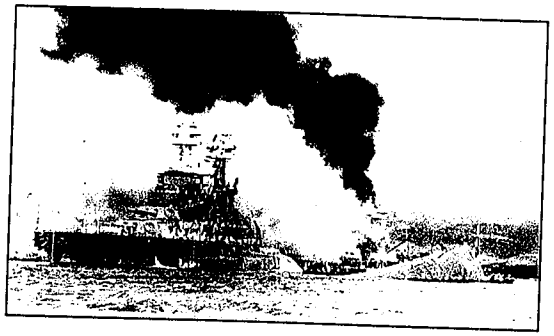
Cargill Turkey Production, LLC

SHIP:

The Oklahoma's losses were the second-heaviest at Pearl Harbor.

FROM A-25





Left, the USS Oklahoma lies capsized in Pearl Harbor alongside the USS Maryland on Dec. 7, 1941. Far left, the Oklahoma, which was christened in 1914, is shown in an April 1938 photo. The battleship was one of the first to carry the U.S. Navy's triple gun turrets.

Associated Press file

More than 400 crewmen lost their lives. That more did not die is owed largely to the heroics of sailors and civilians who cut through the upturned hull to rescue those trapped below decks.

The Oklahoma was refloated in 1943 and sold for scrap after the war, but sank in the Pacific while being towed to California.

"I think the guys who were on the Oklahoma preferred that to having it made into razor blades," said King's friend, Oklahoma state Sen. Jim Reynolds, R-Oklahoma City.

But it wasn't what they would most like. At King's urging, Reynolds became involved with surviving crew members who want the Oklahoma remembered at Pearl Harbor.

The major memorial there is to the USS Arizona, and for good reason. The Arizona took a direct hit from a 1,700-pound Japanese bomb that blew up the ship's forward magazine. The ship sank immediately with the loss of nearly 1,200 lives. It remains at the bottom of the harbor, still oozing oil.

The Oklahoma's losses, though, were the second-heaviest, and its remaining crew, King, Reynolds and others think it deserves a place of honor.

Monday night, the USS Oklahoma gets one.

Reynolds and U.S. Rep. Tom Cole, R-Okla., are among the dignitaries expected for the dedication of a permanent Oklahoma exhibit at the Arizona Memorial.

"It's been a moment many crew members of the Oklahoma have looked forward to," Cole said. "They have waged a very vigorous campaign."

Oklahoma enthusiasts hope the exhibit is just a step toward a memorial of some sort, probably on Ford Island. When it sank, the Oklahoma was anchored off Ford Island, in the middle of the harbor, next to the USS Maryland. The Oklahoma took the brunt of the torpedoes, leaving the Maryland relatively intact.

By coincidence, the decommissioned USS Missouri, now a museum, is anchored in about the same spot.

"We've looked at several sites on Ford Island," Reynolds said. "The problem is with accessibility. Before 9/11 you could get to Ford Island by car. Now the only way for a civilian to go is on a tour of the Missouri. That tour costs about $15. The guys from the Oklahoma want easy access."

Reynolds said there has been some talk of building another dock near the Missouri and operating a shuttle to it from the Arizona Memorial.

Cole said he joined the cause last year when the Oklahoma survivors met in Oklahoma for the first time. U.S. Sen. Jim Inhofe, R-Okla., also got involved, which Cole said was very helpful.

"I've had people at the National Park Service tell me the Oklahoma is a tremendous story, and they weren't that aware of it," Cole said.

The Oklahoma's keel was laid in 1912 at Camden, N.J. Lorena Cruce, Gov. Lee Cruce's daughter, christened the ship in 1914.

The Oklahoma and its sister, the Nevada, displaced 27,500 tons and were the first to carry the U.S. Navy's triple gun turrets. They were also the Navy's first battleships driven primarily by fuel oil.

The Oklahoma and Nevada were also distinctive for their "all-or-nothing" armor, which shifted protection to the ships' most vital areas while leaving others exposed.

During World War I, the Oklahoma patrolled the Atlantic and escorted President Woodrow Wilson to France in 1919. In 1921, it was shifted to the Pacific.

A two-year overhaul in the late 1920s altered the Oklahoma significantly. Airplane catapults were added, weapons systems were replaced and updated and armor added.

In December 1941, the Oklahoma and Nevada were two of the oldest battleships in the U.S. fleet. The only older one, the Utah, was used for training.

All three were at Pearl Harbor.

The Utah, like the Oklahoma, capsized with the loss of about 50 men during the Japanese attack. The Nevada ran for the open sea but was hit and had to be run aground to keep from sinking in the harbor entrance.

The Oklahoma rolled over so quickly that many men below deck were able to survive in pockets of trapped air. A civilian shipyard worker, Julio DeCastro, hurriedly organized the rescue crew that cut through the ship's hull.

The Oklahoma, the Arizona and the Utah were the only ships sunk at Pearl Harbor not to return to service.

Refloating the Oklahoma turned out to be one of the biggest salvage jobs ever, requiring 21 winches and more than a year. The Oklahoma's age and its extensive damage precluded refitting it, but the Navy wanted it out of the way.

Stripped of guns and superstructure, it sank loose in May 1957 while in tow to California.

"This exhibit is long overdue," Cole said. "It's important to remember a unique era that has passed."

Randy Krehbiel 581-8365
randy.krehbiel@tulsaworld.com

CHERRY:

Restaurants helped entertain children with more than just food.

FROM A-25

families to enjoy.

"It's not that much fun just giving away food," she said. "I knew the kids would want something to do. We've been full all day with children. We had to go buy more supplies to keep up."

Austin and Wyatt Bain, along with their parents, participated in all Hideaway had to offer. The boys made crafts, and mom had her face painted.

After they were done there, the family headed down to the tamales outside Doe's.

"I think this is pretty neat," the boys' dad, Joe Bain, said. "Munch your way down Cherry Street."

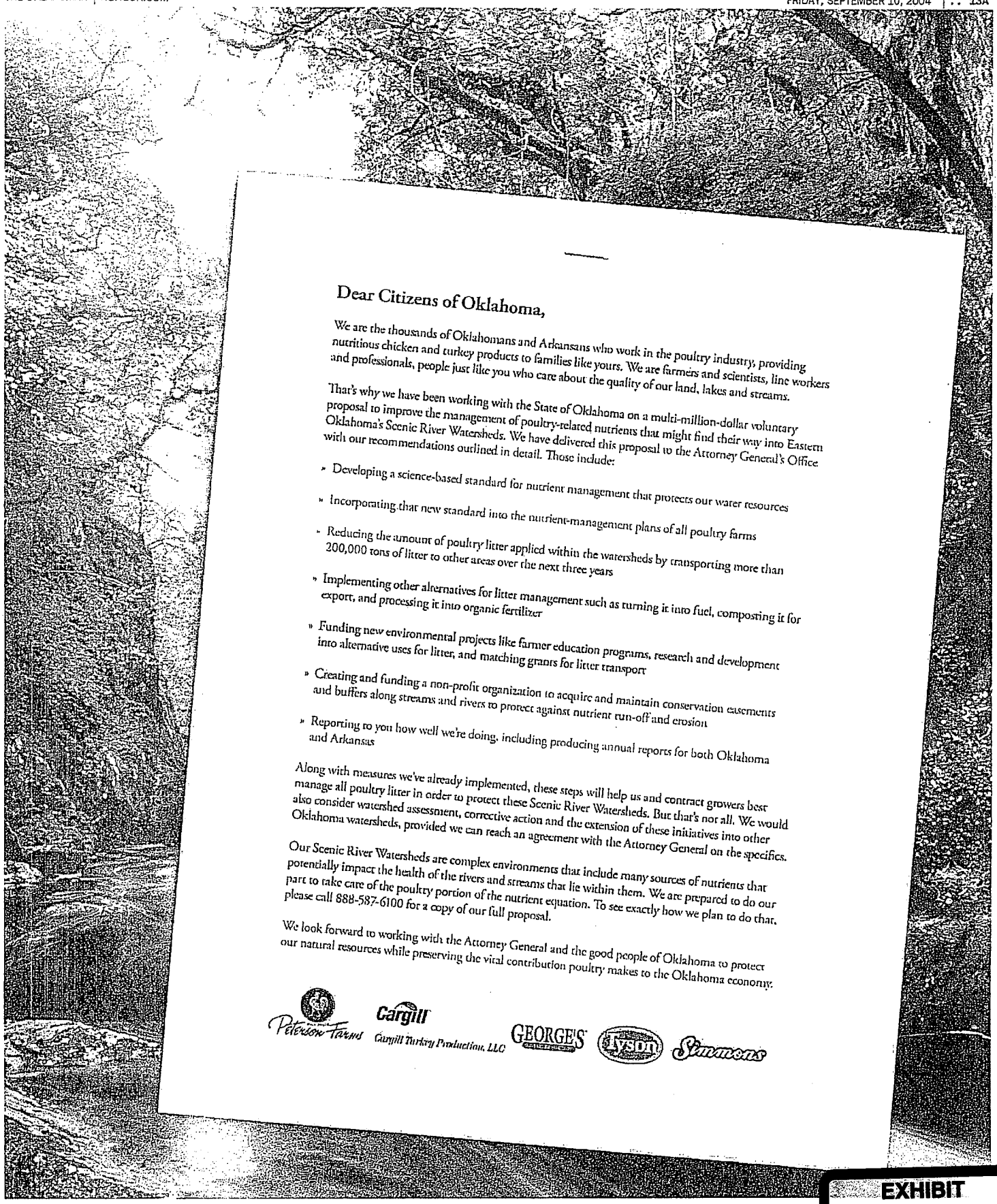
The parade ran down 15th Street from Utica to Peoria avenues and featured the Tulsa Fire Department and its clowns, Santa, a dance troupe, Girl Scouts, Cub Scouts and other civic organizations. Many threw candy to eager children lining the streets.

"I got some candy," 3-year-old Daniel Hanson said, smiling as he gripped a handful of treats. "And I got a pencil."

Representatives from Doe's and Hideaway said they knew the event would be something people would enjoy.

"They said the world's shortest parade was going to be out here today, so we thought we'd set up a booth out here," Doe's owner Skip Long said. "A lot of people haven't tasted my tamales. I think if they taste my tamales, they'll come have a steak."

Amber Wilson 581-8325
amber.wilson@tulsaworld.com



Dear Citizens of Oklahoma,

We are the thousands of Oklahomans and Arkansans who work in the poultry industry, providing nutritious chicken and turkey products to families like yours. We are farmers and scientists, line workers and professionals, people just like you who care about the quality of our land, lakes and streams.

That's why we have been working with the State of Oklahoma on a multi-million-dollar voluntary proposal to improve the management of poultry-related nutrients that might find their way into Eastern Oklahoma's Scenic River Watersheds. We have delivered this proposal to the Attorney General's Office with our recommendations outlined in detail. Those include:

- Developing a science-based standard for nutrient management that protects our water resources
- Incorporating that new standard into the nutrient-management plans of all poultry farms
- Reducing the amount of poultry litter applied within the watersheds by transporting more than 200,000 tons of litter to other areas over the next three years
- Implementing other alternatives for litter management such as turning it into fuel, composting it for export, and processing it into organic fertilizer
- Funding new environmental projects like farmer education programs, research and development into alternative uses for litter, and matching grants for litter transport
- Creating and funding a non-profit organization to acquire and maintain conservation easements and buffers along streams and rivers to protect against nutrient run-off and erosion
- Reporting to you how well we're doing, including producing annual reports for both Oklahoma and Arkansas

Along with measures we've already implemented, these steps will help us and contract growers best manage all poultry litter in order to protect these Scenic River Watersheds. But that's not all. We would also consider watershed assessment, corrective action and the extension of these initiatives into other Oklahoma watersheds, provided we can reach an agreement with the Attorney General on the specifics.

Our Scenic River Watersheds are complex environments that include many sources of nutrients that potentially impact the health of the rivers and streams that lie within them. We are prepared to do our part to take care of the poultry portion of the nutrient equation. To see exactly how we plan to do that, please call 888-587-6100 for a copy of our full proposal.

We look forward to working with the Attorney General and the good people of Oklahoma to protect our natural resources while preserving the vital contribution poultry makes to the Oklahoma economy.

Peterson Farms Cargill Cargill Turkey Production, LLC GEORGE'S TYSON Simmons

EXHIBIT 60

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA,	)	
	)	
Plaintiff,	)	
	)	
v.	)	**Case No. 05-cv-329-GKF(PJC)**
	)	
TYSON FOODS, INC., et al.,	)	
	)	
Defendants.	)	

DECLARATION OF C. ROBERT TAYLOR

I, C. Robert Taylor, Ph.D., hereby declare as follows:

1. I am the Alfa Eminent Scholar and Professor of Agricultural Economics at Auburn University, Auburn, Alabama. This position is equivalent to the rank of Distinguished University Professor. I hold a B.S. degree in agricultural economics from Oklahoma State University, a M.S. degree in economics and agricultural economics from Kansas State University, and a Ph.D. degree in agricultural economics from the University of Missouri-Columbia. I have held tenured positions at the University of Illinois, Montana State University and Texas A&M University in addition to Auburn University. I served on the Executive Board and Foundation Board of the American Agricultural Economics Association, which is the national association for agricultural economists, from 1998-2001. I have served on the editorial board of four scholarly journals, including the American Journal of Agricultural Economics, which is the premier journal in my profession. I am co-author of one graduate textbook, editor of one book, co-editor of three books, and I have authored about one hundred peer reviewed scholarly articles, plus an additional hundred reports, book chapters and other publications.

2. I have conducted economic analyses for the United States Department of Agriculture, the United States Environmental Protection Agency, the United States Department of Energy, the National Science Foundation, the Natural Resources Economics Service, the United States Army Corps of Engineers, the United States Forest Service, the American Farm Bureau Research Foundation, Ciba-Geigy Company, the United States Congressional Office of Technology Assessment, the National Crop Insurance Service, various state agencies, and state agricultural organizations. I have also given "briefings" on price, income and consumer effects of pesticide policy to the United States Senate and House Agriculture Committees, to the United States Environmental Protection Agency, to a national agricultural industry group, and to the Chief Economist of the United States Department of Agriculture.

3. I testified to the United States Senate Committee on Agriculture, Nutrition and Forestry in a session on Economic Concentration in Agribusiness in 1999, and I provided

EXHIBIT 61

testimony for the United States House Agricultural Committee Hearings on Livestock Prices. I also testified to the United States Senate Committee on Agriculture, Nutrition and Forestry in 2002 in a session on banning packer ownership of cattle and hogs, and on USDA/GIPSA's enforcement of the Packers and Stockyards Act. In April of 2007, I testified to the United States House of Representatives Committee on Agriculture, Subcommittee on Livestock, Dairy and Poultry on key issues affecting the livestock and poultry industries.

4. In 2002, I gave an invited talk to the Oklahoma Senate titled "The Global Food System: Legal Issues from an Economist's Perspective." I also gave a talk in 2002 on "Contract Agriculture: Legal Issues from an Economist's Perspective" at a CLE conference sponsored by the Oklahoma Attorney General's Office and the Oklahoma Bar Association.

5. Early in my professional career, I conducted substantive research on plant nutrients as water pollutants. More recently, I have done extensive work regarding the economics of the livestock and poultry industries, including analyses of market power imbalances.

6. I have been retained by the State of Oklahoma to evaluate the relationship between poultry growers and defendant poultry companies and to assess the economics of the poultry industry, including removal of poultry waste from the Illinois River Watershed (IRW).

7. On May 15, 2008, I submitted my expert report to Defendants.

8. The following text in this Declaration is taken verbatim from my May 15, 2008 expert report, ¶¶ 36-41, 45.

9. Integrators make the decisions about the location of grow-out facilities. Integrator control over location of production facilities is so complete that individuals desiring to become growers who are outside an area defined by an integrator—typically 25-50 miles—are simply not offered the option to become a grower.

10. In my opinion, defendants' desire to minimize feed and bird transportation costs is the economic driving force behind their concentration of growers and thus waste generation in the IRW. A statistical analysis of survey responses by Sambidi, et al, identifies location of the feedmill serving the complex to be the top indicator of location of grow-out facilities, a conclusion based on survey responses by chief executive officers within the broiler industry.[1] Vukina and Leegomonchai state, *"Contract growers are typically located within a short distance from the integrator's processing plant because live birds cannot be hauled long distances. Broiler operations also tend to be*

[1] P. R. Sambidi, R. W. Harrison, and A. J. Farr, A Conjoint Analysis of Site Selection for the U.S. Broiler Industry: Implications for Louisiana, Louisiana State University Ag Research and Extension Center Bulletin No. 882, August 2004.

concentrated in the proximity of feedmills such that integrator's costs of distributing feed to contract producers are minimized. These characteristics are very important because they restrict the grower's choice of integrators."[2] MacDonald and Korb also point to feed and bird hauling costs, "*... transportation costs (including the mortality risk to chicks and broilers from truck transport) make for local markets in live poultry, greatly reducing the number of potential buyers."*[3]

11. Many integrators even specify a maximum allowable distance between a broiler farm and the feed mill. For example, a Tyson web page, which was recently removed, stated, *"Normally the (grower) farms are required to be within thirty to forty miles of the feedmill in the complex."*[4] Kirk Houtchens, representing Peterson Farms, stated that distance was an important factor in locating growers; he also stated that 50 miles from a feedmill was about the maximum distance for a grower.[5] Defendants' desire to minimize their out-of-pocket feed and bird hauling costs therefore concentrate waste products in a small geographical area. Integrators, not growers, therefore directly determine where waste products are generated in the IRW.

12. Agricultural statistics indicate that feed grain (e.g. corn) and high protein crop (e.g. soybeans) production is practically non-existent in the IRW. Phosphorus contained in the feedstuffs, and that added to poultry feed, thus constitute the major source of phosphorus imported into the IRW.

13. The fact that multiple integrators chose to locate in the same area, particularly the IRW, further concentrates and exacerbates pollution, health and other environmental problems caused by poultry waste. An April 2008 report by the Union of Concerned Scientists states, *"The problems that arise from excessive size and density (e.g. air and water pollution from manure, overuse of antibiotics) are exacerbated by the parallel trend of geographic concentration, whereby CAFOs [confined animal feeding operations] for particular types of livestock have become concentrated in certain parts of the country. For example ... broiler chicken CAFOs in Arkansas and Georgia."*[6] They also state, *"Manure from CAFOs is a major source of water pollution because these operations produce too much manure in too small an area, and this manure is rarely*

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2 T. Vukina and P. Leegomonchai, "Oligopsony Power, Asset Specificity and Hold-Up: Evidence from the Broiler Industry," American Journal of Agricultural Economics, Vol. 88 (December 2006): 1258-1265.

3 James M. MacDonald and Penni Korb, "The Growing Use of Contracts to Govern US Farm Production, Paper presented at the 2006 Annual Conference of the International Society for New Institutional Economics, Boulder, CO, September 23, 2006, p. 12.

4 http://www.tysonfoodsinc.com/corporate/info/growersFAQ.asp downloaded on 8/10/2005.

5 Deposition of Kirk Houtchens, July 26, 2007, 28:18 through 30:18.

6 Doug Gurian-Sherman, CAFOs Uncovered: The Untold Costs of Confined Animal Feeding Operations, Union of Concerned Scientists, April 2008, p. 2.

treated to eliminate potentially harmful components before being applied to crop fields or stored in facilities such as lagoons or pits (EPA 2003)"[7]

14. An integrator's decisions about where to locate a complex and the size of the area in which growout facilities (and thus waste production) is typically based on its out-of-pocket expenses for hauling feed to growout facilities and birds to processing plants. The business model adopted by defendants ignores external (pollution and health) costs associated with poultry waste and thus results in waste generation and land application of waste being concentrated in relatively small geographical areas. Watershed pollution problems in the aggregate are therefore determined not by an individual farmer's growout operations, but by defendant's individual and collective decisions to concentrate poultry production and thus waste generation in relatively small geographic areas. As stated in a University of Arkansas Extension Bulletin, *"The real issue is not the P concentration in runoff from the edge of any one field, but the total P load that is transported to the stream or lake from an entire watershed."*[8]

15. Early grower contracts made no mention of used litter and waste disposal responsibilities. However, since the early 1990s, defendants' contracts typically state that the grower is responsible for meeting all applicable state, federal, and local environmental laws and regulations. Examples of the evolution of defendants' contracts with specific reference to used litter and waste follow.

a. Defendant Cargill's turkey contract in 1981 did not mention responsibility for, or disposal of, used litter and waste, except for the grower's responsibility to dispose of dead birds (CARTP133037 – CARTP133047). Cargill's 1990 contract, however, stated, *"Grower agrees to comply with all applicable state, county, local and federal* ***health*** *laws."* (CARTP135792 – CARTP135796). Cargill's 1993 contract expanded wording in the 1990 contract to state *"Grower aggress to comply with all applicable state, local, and federal laws and requirements, including but not limited to* ***health and environmental*** *regulations."*[9] (CARTP002257 – CARTP002260). Cargill's 2005 contract also required the grower to have an approved Nutrient Management Plan that complied with all applicable federal, state, and local laws and regulations and complied with best management and agronomic practices in the region (CARTP007134 – CARTP007141).

b. Defendant Tyson's 1986 broiler contract did not specifically mention disposal of used litter and waste, or responsibility for disposal of dead birds (TSN54063SOK – TSN54064SOK). However, Tyson's broiler contract for 1999 states *"The Producer shall be responsible for the removal of all dead birds and*

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[7] *Ibid.*, p. 42.

[8] Mike Daniels, Tommy Daniel and Karl VanDevender, Soil Phosphorus Levels: Concerns and Recommendations, University of Arkansas Division of Agriculture, Cooperative Extension Service, Bulletin FSA1029-500-3-04R, 1999 and 2004.

[9] Bold emphasis added.

litter and shall dispose of dead birds and litter in accordance with the law applicable to this location." (TSN54238SOK – TSN54239SOK). Tyson's 2006 broiler contract is more specific, *"Producer will comply with all applicable federal, state, and local statutes, rules, regulations, and ordinances in performance of this Contract, including but not limited to all those governing environmental and poultry litter management."* (TSN107938SOK – TSN107939SOK).

c. Defendant George's' 1987 pullet growing contract did not mention responsibility for disposal or ownership of used litter and waste (GE312 GE315), while their 1993 contract states that the grower will *"Dispose of litter in accordance with Best Management Practices, a copy of which has been provided,*[10] *and to work with Soil Conservation Service in developing a Nutrient Management Plan for his farm, and to follow all regulations pertaining to litter disposal."* (GE241 – GE246). George's' 1997 pullet growing contract has the same wording about litter disposal as the 1993 contract (GE817 – GE822), but has an attachment that gives detailed guidelines for poultry waste management. This attachment (GE823) states that it was *"compiled by Cooperative Committee for Poultry Farm Litter and Waste Disposal, comprised of members of the Arkansas Poultry Federation, Soil Conservation Service, Arkansas Department of Pollution Control and Ecology, Arkansas Extension Service, and Arkansas Soil & Water Conservation Service."* George's' broiler contracts show a similar evolution of assignment of responsibility for used litter and waste to the grower.

d. Defendant Simmons' broiler contracts for 1979 and 1986 make no mention of responsibility for disposal or ownership of used litter and waste (SIM AG 13722 –SIM AG13724, SIM AG 30790 – SIM AG 30793). However, their 1995 broiler contract states that the grower agrees *"To follow the Federal Insecticide, Fungicide and Rodenticide Act, as well as appropriate FDA, USDA, and EPA regulations."* (SIM AG 12633 – SIM AG 12635). The 1997 contract added the requirement that the grower *"dispose of litter in accordance with Best Management Practices as detailed by the nutrient management plan for Grower's farm developed with appropriate governmental agencies, and to follow all applicable regulations pertaining to litter disposal."* (SIM AG 12388).

e. Defendant Peterson's 2004 broiler contract, like recent Simmons' contracts, states that the Grower agrees, *"To follow Federal Insecticide, Fungicide and Rodenticide Act of 1947, as well as appropriate FDA, USDA, State, and EPA regulations."* (PFIRWP-000835 –PFIRWP-000844). The contract also requires the grower to have and follow a litter management plan, and to provide Peterson with a copy of that plan. Unlike contracts used by other defendants, the 1999 Peterson contract states, *"All poultry waste produced by the birds covered by this contract shall be the exclusive property of the Contract Farmer and the Contract Farmer shall be responsible for and receive all of the*

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[10] Such a copy was not attached to the 1993 contract I reviewed.

economic benefits from the use and disposal of said waste." (PFIRWP-0747060 – PFIRWP-0747062). Peterson's 2004 broiler contract has essentially the same wording, *"... the litter shall be the exclusive property of the contract grower and contract grower shall be responsible for and receive all of the economic benefits from the use and disposal of said litter."* (PFIRWP-000838). Peterson's 2005 broiler contract (PFIRWP-000819 – PFIRWP-000829) states that the litter is the exclusive property of the grower, but then goes on to specify exactly how the grower is to dispose of litter and waste he/she presumably owns. Waste disposal practices in Peterson's contract (PFIRWP-000826) are those developed by the Cooperative Committee for Poultry Farm Litter and Waste Disposal, which are also included in George's recent contracts (e.g. GE823).

f. Defendant Peterson's 1997 Breeder Hen contract makes no mention of responsibility for waste generated by defendant's birds, although it does require the grower to dispose of all dead birds. Defendant Peterson's 2004 Pullet contract requires a litter management plan as required by Peterson Farms **or** federal, state or local law. Unlike contracts used by other defendants, this Peterson contract states, *"all poultry waste produced by the birds covered by this Agreement shall be the exclusive property of the contract farmer and the contract farmer shall be responsible for and receive all of the economic benefits from the use and disposal of said waste."* (PFIRWE0012498 – PFIRWE0012503).

g. The 2003 Cal-Maine Breeder Pullet Brooding and Rearing Agreement does not explicitly mention responsibility for used litter and waste, although it states that the grower must *"... comply with all applicable sta[t]e, local, and federal health laws. In the event that grower shall fail to comply with an[y] provision of the applicable laws, then owner is hereby granted and shall have the right to enter upon the grower's premises and correct and perform such necessary acts so as to comply with said laws or regulations and the expenses incurred thereto shall be charged to the grower."* (CM-001366 – CM-001368).

h. A 1991 Cal-Maine Egg Production Agreement states that the grower agrees *"To provide all clean up, according to Owner's specifications; and to comply with accepted practices of waste and dead bird disposal. ... To comply with all applicable state, county, local and federal laws; in the event that grower shall fail to comply with any provision of the applicable laws, then owner is hereby granted and shall have the right to enter upon the grower's premises ... and correct and perform such necessary acts so as to comply with said laws or regulations and the expenses incurred thereto shall be charged to the Producer."* (CM-000000338 -- CM-000000343). In contrast, a 1992 Cal-Maine Egg Production Agreement states that *"Producer agrees to be responsible for the proper clean up of Producer's facilities in accordance with generally accepted poultry husbandry practices and to comply with all applicable laws and regulations, including, but not limited to, rules and regulations promulgated by the Environmental Protection Agency and the agency of Producer's state responsible for disposal of waste and emissions, relative to the disposal of any*

and all waste products produced from Producer's facilities including, but not limited to, waste water run-off, manure and dead birds." (CM-000000332 – CM-000000333).

i. Cobb-Vantress Breeder Hen contract for 2001 requires the grower *"To clean litter from houses upon completion of bird cycle."* This contract also states *"The Producer agrees to provide poultry disposal equipment and to dispose of all dead birds according to the company's specifications and as required by federal, state and local laws."* Although this contract requires the grower to provide "poultry" disposal equipment, it does not specifically mention responsibility for disposal of waste. (TSN60299SOK -- TSN60302SOK). In contrast, the 2003 Cobb-Vantress Breeder Hen contract states, *"The Producer shall be responsible for removing all dead birds and litter and shall dispose of such in accordance with the Company's specifications and applicable laws. ... The Producer agrees to remove all litter and debris from the poultry houses as soon as possible after the completion of the bird cycle."* (TSN60289SOK -- TSN60294SOK). The 2005 Cobb-Vantress Breeder Hen contract adds to the wording in the 2003 contract that *"The Producer agrees to comply with all applicable federal, state, and local statutes, rules, regulations, and ordinances in performance of this contract, including but not limited to all those governing environmental and poultry litter management."* (TSN60277SOK -- TSN60281SOK).

I declare, under penalty of perjury, under the laws of the United States of America, that the foregoing is true and correct.

Executed on the 14th day of May, 2009.

C. Robert Taylor, Ph.D.

INTEROFFICE MEMORANDUM

To: Dan Henderson

CC: Vic Evans , Janet Wilkerson

From: Ron Mullikin

Date: March 27, 1998

Subject: Opinions on the Poultry Litter Issues

Dan,

In the past few months I have been exposed to a wealth of information and individuals in the poultry industry. I would like to share with you some of my views of where we are, and where we may be headed, on the poultry litter issue.

I personally have no opinion on whether or not the intergrator or the grower owns the litter. I do feel, without any doubt, that as time passes, we the intergrator will be found to be liable for it and the affect it has on our environment. This position will be driven by both environmental groups and the EPA.

Increases in regulation , by a number of federal, state and local agencies, will continually increase on the poultry producers. Unfortunately, too many of these regulations are being driven by political ambition. We have VP Gore, leading the fight to clean the nations waterways, and at the same time lead the fight to become our next president. Knowing full well, no one will be able to fight his environmental record. We have the mayor of Tulsa, who would like to be the Gov. of OK.. Politics will continue to drive this issue.

We are also faced with a lack of science to help us understand where we are, and where we need to go. Agronomists can't agree on the movement of phosphate, the water solubility of the P in the litter, and means of making P more efficient in our feeds. How much P in our soils is too much? Agencies can't agree on max. soil levels.

FROM THE DESK OF...

RON MULLIKIN
DIRECTOR CORP. TRAINING
PETERSON FARMS
P.O. BOX 248
DECATUR, AR. 72722

501-752-5218
Fax: 501-752-5640

PLAINTIFF'S EXHIBIT No. 4 Mullikin Dep.

EXHIBIT 62

And if they could agree, how would they measure it? In our few check samples, we demonstrated how hard it is to get a good accurate sample.

Dan, I feel the direction Peterson Farms and all intergators would be best served to focus its resources towards, would be alternative uses. Things such as using litter as bedding, feed, fertilizer, and fuel are just a few of the uses I've found some information on. Each of these uses has it's own set of benefits and short-comings. But they all address the environmental need to stop applying litter to our local pasture lands. I have attached a Pro-forma on a pelletizing plant in Purdy, MO., that is currently for sale. (I made it very clear we had no interest in purchasing that plant!)

By finding an alternative use, we have helped our growers, helped our environment, and greatly reduced our companies potential liabilities.

case. And by -- I should say more formally it's the case that was brought by the City of Tulsa and the TUMA against a number of poultry companies and an Arkansas municipality over water quality problems in the Eucha-Spavinaw watershed, which is Tulsa's water supply.

Q. Do you know whether there was ever a moratorium on land application leading up to or subsequent to this order?

A. Subsequent to this order. What the order did was require that land application in that watershed not occur until there were new plans written based on a newly adopted phosphorus index. And so from the summer of 2003 when that was implemented, well into and through much of the next year, there was a moratorium on land application in that watershed.

Q. To your knowledge, were any growers or farmers in that case?

A. I don't believe that there was a single grower or a single farmer in that case.

Q. So the named defendants were the companies?

A. The only -- the named defendants were the companies. The order bound them and the result was a moratorium, an effective moratorium, and then an effective change in how it is that litter was managed in that watershed.

Q. And in your opinion, will the risks associated with these bacterial levels be substantially reduced if the injunction is granted?

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Case No. 05-cv-329-GKF(PJC)
	)	
TYSON FOODS, INC., et al.,	)	
	)	
Defendants.	)	

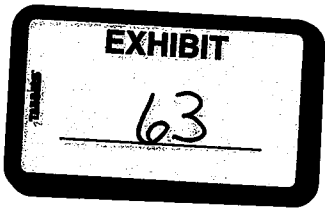
DECLARATION OF BERNARD ENGEL, Ph.D.

I, Bernard Engel, Ph.D., hereby declare as follows:

1. I hold a B.S. and M.S. in Agricultural and Biological Engineering from the University of Illinois and a Ph.D. in Agricultural Engineering from Purdue University. I am a registered Professional Engineer (PE) in the State of Indiana. Since 1988, I have been a faculty member in the Purdue University Department of Agricultural and Biological Engineering. I am currently Department Head and Professor within this program. My research, teaching and outreach expertise are in environmental engineering and the application of information systems technologies to environmental problems. I have extensive experience in developing and applying computer models, databases, and geographic information systems to a range of environmental issues. In this regard, I have developed hydrologic/water quality models and decision support systems that are widely used by consultants and local, state and federal agencies. My work has allowed me to obtain extensive experience in applying models and information technologies to assess nutrient and pesticide movement in surface waters of watersheds and into watershed groundwater. I have published more than 100 articles on related topics in peer reviewed scientific journals.

2. I have been retained by the Oklahoma Attorney General to evaluate the generation and land application of poultry waste within the Illinois River Watershed ("IRW"). In addition, I have been asked to evaluate the movement of this waste and its constituents into streams, rivers, and groundwaters within the IRW and into Lake Tenkiller.

3. On May 22, 2008, I submitted an Expert Report to the Defendants in the above-captioned litigation. Included in the Expert Report are my findings and opinions regarding poultry waste and phosphorus (P) generation in the IRW.



4. The following statements and opinions in this Declaration are taken verbatim from my May 22, 2008 Expert Report, pp. 12-17.

5. Annual poultry waste generated in the Illinois River Basin was calculated using several sources of data. ***The analyses indicate each of the defendants' poultry operations within the Illinois River Watershed (IRW) produces a substantial amount of poultry waste and phosphorus. Calculated poultry waste produced within the IRW range between 354,000 and more than 500,000 tons annually. Phosphorus content of the poultry waste ranges from 8.7 million to nearly 10 million pounds annually.***

6. *Poultry Production Data from Integrators*

The 2001-2006 poultry production data for the Illinois River Basin provided by the integrators (Table 3.1) was used to calculate poultry waste and phosphorus (P) production. Not all integrators provided production data by type of poultry. Therefore, it was necessary to estimate the number of poultry by type for Tyson and Simmons. This was done by using the number of houses of each type of poultry by integrator created by Dr. Fisher (Fisher, 2008) and the average poultry production by type per house from the Arkansas Soil and Water Conservation Commission to estimate the proportion of poultry type for Tyson and Simmons. The Cobb data were combined with Tyson data.

Poultry waste production was calculated using waste values from the USDA Agricultural Waste Management Field Handbook, Ch.4 - Ag Waste Characteristics. The average weights of poultry by type were obtained from the Arkansas Soil and Water Conservation Commission data.

Table 3.1. Poultry Production in the Illinois River Basin Provided by Defendants' Discovery Responses

Defendant	2001	2002	2003	2004	2005	2006
Cal-Maine	1,135,998	879,281	633,656	403,739	200,000	0
Cargill	3,058,603	3,032,295	3,381,331	3,545,084	3,381,451	2,305,422
Cobb	1,189,358	1,279,798	1,237,193	1,250,237	1,243,562	1,244,481
George's	19,972,941	20,082,206	21,312,971	23,535,964	26,524,368	27,479,391
Peterson	13,277,715	14,454,936	14,897,458	20,981,977	18,166,724	16,887,638
Simmons	15,400,000	17,600,000	18,600,000	25,400,000	31,600,000	27,400,000
Tyson	87,027,895	88,142,559	90,098,641	95,023,680	89,719,497	88,639,337
TOTAL	**140,870,901**	**145,267,093**	**149,255,914**	**170,140,681**	**170,835,602**	**163,956,269**

The annual poultry waste and P produced by poultry based on poultry production data provided by the defendants are shown in Table 3.2 for the years 2001-2006. Phosphorus in the poultry waste shown in Table 3.2 is consistent with calculations obtained in performing a P mass balance for the Illinois River Watershed (as setout in Section 7 of this report and Appendix B). Waste ranges from nearly 420,000 tons in 2001 to more than 482,000 tons in 2004. Phosphorus in the poultry waste ranges from more than 8.7 million pounds in 2001 to nearly 10 million pounds in 2004.

Table 3.2. Poultry Waste and P Production within the IRW Based on Defendant Supplied Poultry Production Data

Year	Total Waste (tons)	Total P (lbs)
2001	420,555	8,732,752
2002	425,308	8,801,173
2003	440,920	9,176,463
2004	482,407	9,975,305
2005	476,649	9,819,383
2006	445,364	9,000,113

The annual poultry waste produced by integrator based on defendant supplied poultry production data is shown in Table 3.3. Each defendant produces a substantial amount of waste with Tyson producing approximately ½ of the waste.

Table 3.3. Poultry Waste by Defendant within the IRW Based on Defendant Supplied Poultry Production Data for 2001-2006

Poultry Waste (tons)

Year	Cal-Maine	Cargill	Georges	Peterson	Simmons	Tyson+Cobb
2001	18,626	45,086	69,510	27,970	40,247	219,116
2002	14,561	44,698	67,494	30,450	45,996	222,110
2003	10,821	49,843	73,401	31,382	48,610	226,862
2004	6,712	52,257	73,730	44,199	66,381	239,128
2005	3,135	49,845	76,879	38,269	82,585	225,936
2006	0	33,984	80,943	35,574	71,608	223,256

The annual P produced in poultry waste by integrator based on defendant supplied poultry production data is shown in Table 3.4. Each of the defendants' poultry operations produce a substantial amount of P in poultry waste with Tyson's producing approximately ½ of P in poultry waste.

Table 3.4. Phosphorus in Poultry Waste by Defendant within the IRW Based on Defendant Supplied Poultry Production Data for 2001-2006

P in Poultry Waste (lbs)

Year	Cal-Maine	Cargill	Georges	Peterson	Simmons	Tyson+Cobb
2001	396,398	1,484,311	1,452,470	543,414	768,007	4,088,152
2002	311,363	1,471,544	1,404,951	591,594	877,722	4,143,999
2003	233,511	1,640,927	1,532,054	609,705	927,592	4,232,673
2004	145,707	1,720,395	1,522,252	858,725	1,266,712	4,461,513
2005	71,837	1,640,986	1,571,747	743,505	1,575,910	4,215,398
2006	0	1,118,799	1,658,320	691,157	1,366,453	4,165,384

7. *USDA Agriculture Census Data*

In calculating poultry waste generated in the Illinois River Basin using the 2002 USDA Agriculture Census data, poultry were allocated to the basin using the proportion of pasture within counties to assign the proportion of poultry in the county to the basin. This approach calculated approximately 528,000 tons of poultry waste per year generated in the IRW.

Annual poultry waste generation was also calculated using 2002 USDA Agricultural Census data by allocating poultry to the basin proportional to the area of each county within the watershed. Calculated annual poultry waste in the IRW using this allocation approach is approximately 414,000 tons per year.

8. *Arkansas Soil and Water Conservation Commission Data*

The Arkansas Soil and Water Conservation Commission 2007 Poultry Registration data on poultry production in the Illinois River Basin were used to estimate poultry waste production in the basin. This data contained the type of poultry, weight, number, number of flocks, and number of houses. These data were provided for poultry operations that were within the basin within Benton and Washington counties. The average poultry production by type by house was computed from these data as was the average weight of poultry.

The number of active poultry houses with known integrators within the Oklahoma portion of the basin was obtained from Dr. Fisher (Fisher, 2008). These houses had an assigned poultry type as well. Poultry numbers for the Oklahoma counties were computed using the average production numbers by type of poultry from the Arkansas Soil and Water Conservation Commission data.

The poultry waste values provided by the Arkansas Soil and Water Conservation Commission used equations that are unrealistic with regard to the amount of poultry waste produced per bird as removed from poultry houses. The equations used by the Arkansas Soil and Water Conservation Commission to compute poultry waste calculate the amount of waste excreted on a dry weight basis (amount of waste excreted with all water removed and without inclusion of bedding materials). Therefore, poultry waste production was calculated using waste values from the USDA Agricultural Waste Management Field Handbook, Ch.4 - Ag Waste Characteristics. The average weights of poultry by type were obtained from the Arkansas Soil and Water Conservation Commission data.

The calculated annual poultry waste production using this approach within the IRW is approximately 477,000 tons. The poultry house data prepared by Dr. Bert Fisher that identified integrator and type of poultry were used to calculate the proportion of each poultry type produced by each integrator (Fisher, 2008). Using this information and total

waste production for each type of poultry, the litter production within the IRW for each integrator was computed and is shown in Table 3.5.

Table 3.5. Calculated Annual Waste Production (tons) by Integrator Using Arkansas Soil and Water Conservation Commission Data and USDA Waste Characteristics Field Manual

Poultry Waste Production (tons/yr)

Type	Cal-Maine	Cargill	Georges	Peterson	Simmons	Tyson
Breeder	456	4,785	5,468	684	7,974	25,518
Broiler	0	1,018	56,006	38,950	58,552	148,162
Cornish	0	0	0	0	0	11,103
Turkey	0	52,073	0	0	0	0
Layer	12,362	0	11,411	6,657	0	6,657
Pullet	349	0	5,239	524	3,842	20,084
Total	13,167	57,876	78,125	46,814	70,368	211,523

The Arkansas Soil and Water Conservation Commission data show the following amounts of poultry waste generated within the Illinois River Watershed (Table 3.6). The poultry waste estimates by the Arkansas Soil and Water Conservation Commission use equations that greatly under predict poultry waste generation per bird as it would be removed from poultry houses. The equations used by the Arkansas Soil and Water Conservation Commission to compute poultry waste calculate the amount of waste excreted on a dry weight basis (amount of waste excreted with all water removed and without inclusion of bedding materials).

Table 3.6. Arkansas Soil and Water Conservation Commission (ASWCC) Estimate of Poultry Waste Generated in the Illinois River Watershed. Note the Equation Used by ANRC Underestimates Waste Production as Removed from Poultry Houses. Equation Estimates Waste Production on a Dry Weight Basis Without Bedding.

ASWCC Poultry Waste Generated in IRW (tons)

County	2004	2005	2006	2007
Benton	56,470	70,168	62,507	95,091
Washington	72,896	107,003	89,141	120,014

If the Arkansas Soil and Water Conservation Commission poultry waste estimate for 2007 (215,105 tons) is converted to waste as removed from poultry housing (includes some moisture and bedding material), the estimated poultry waste produced in Benton and Washington Counties is more than 376,000 tons. This is based on USDA Agricultural Waste Management Field Handbook, Ch.4 - Ag Waste Characteristics characterizations of poultry waste data (20 lbs dry weight per 1000 lbs broilers and 35 lbs as removed from housing including bedding per 1000 lbs broilers; to convert waste in Table 3.6 to as removed multiply values by 35/20 or 1.75).

9. *Poultry Waste Generated within the IRW Based on Poultry House Data*

Fisher (2008) calculated poultry waste generation within the IRW based on active poultry houses within the IRW, house sizes, type of poultry, integrator, and waste production data. Poultry houses within the IRW were identified from aerial photography and various data sources and observations were used to identify active houses (Fisher, 2008). The sizes of active houses were measured from aerial photography within a GIS. The integrator and type of poultry produced within each active house was identified from various records and observations (Fisher, 2008). The amount of waste produced per unit area of house by poultry type was calculated from data in animal waste management plans prepared under the supervision of the U. S District Court (N.D. Okl.) by the Eucha/Spavinaw Watershed Management Team. Additional details of the calculation are provided in Fisher (2008).

Table 3.7 shows the amount of poultry waste produced by each integrator within the IRW based on the data and calculations overviewed above. Each of the defendants produces a significant amount of poultry waste within the IRW.

Table 3.7.
Poultry Waste Production (tons) Within the Illinois River Watershed Calculated from a Consideration of the Total Area of Active Poultry Houses Operated by a Known Defendant (from Fisher, 2008)

Defendant	Broiler	Breeder	Turkey	Pullet	Cornish	Hen	TOTAL	%
Cal-Maine		358		112		2,280	2,750	0.78%
Cargill		2,860	15,108				17,968	5.08%
Georges	49,813	5,911		2,489		1,888	60,101	16.98%
Peterson	35,063	491		277		1,311	37,143	10.49%
Simmons	58,724	5,757		1,818			66,299	18.73%
Tyson	129,421	18,593		7,735	9,874	1,521	167,144	47.22%
Willowbrook			2,597				2,597	0.73%
TOTAL	273,022	33,970	17,704	12,430	9,874	6,999	**354,000**	
	77.12%	9.60%	5.00%	3.51%	2.79%	1.98%		

10. *Literature Estimates of Poultry Waste and P in Poultry Waste in the IRW*

Reports and published journal papers have estimated poultry waste and P in poultry waste within the IRW. The estimates in these reports as described below are consistent with the analyses presented in the preceding sections.

Willett et al. (2006) estimated more than 361,000 tons of poultry waste was generated and applied within the IRW annually. They estimated this waste contained more than 9,000 tons of P. They recommended that poultry waste be exported from the watershed to address water quality issues in the IRW.

In reviewing the sources of nutrients, a 1989 Soil Conservation Service (USDA-SCS, 1989) inventory estimated more than 93,400,000 chickens and other poultry are produced in the basin each year, producing 366,000,000 kilograms (403,000 tons) of manure. Vieux and Moreda (2003) noted that the P generated by the poultry industry in the IRW is equivalent to a human population of 8 million people.

Smith et al. (1997) analyzed HUCs (watersheds) to identify the contributors of nutrients to streams and rivers. For the Illinois River Watershed, they found that livestock contributed 93.01 kg P per square km per year (out of a total of 118.29 kg P per square km per year), while point sources contributed 5.33 kg P per square km per year and fertilizer contributed 8.52 kg P per square km per year.

Nelson et al. (2002) found nearly 6,000,000 lbs of P annually were input into the Arkansas portion of the Illinois River Watershed (7,000,000 lbs if cattle are considered but Nelson et al. acknowledge that cattle are recycling P). Of the approximately 6,000,000 lbs of P, nearly 5,000,000 lbs of P were estimated to be from poultry litter application to pastures in the watershed.

The USDA SCS and FS (1992) estimated that poultry in the IRW generated twice as much manure as cattle in the IRW. They estimated poultry manure in the IRW contained 5 times as much P as cattle manure in the IRW.

11. *Summary of Poultry Waste Generation in the IRW*

Table 3.8 summarizes the poultry waste generation within the IRW by method and/or source. Poultry waste generated within the IRW ranges between 354,000 tons annually to more than 500,000 tons annually.

Table 3.8. Poultry Waste Generated in the Illinois River Watershed

Source	**IRW Poultry Waste (tons/yr)**
Dr. Fisher (Fisher, 2008)	354,000
Defendant supplied poultry and USDA waste coefficients (2001-2006)	421,000-482,000
USDA Census and USDA waste coefficients (2002)	414,000-528,000
Arkansas Soil and Water Conservation Commission Data, Dr. Fisher house data, USDA waste coefficient (2007)	477,000
USDA-SCS (1989)	403,000
Willett et al. (2006)	361,000

I declare under penalty of perjury, under the laws of the United States of America, that the foregoing is true and correct.

Executed on the 14th day of May, 2009.

Bernard Engel, Ph.D.

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, ex rel, W.A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA, et al.

Plaintiffs,

V.

TYSON FOODS, INC., et al.,

Defendants.

No. 05-CV-329-GKF-SAJ

REPORTER'S TRANSCRIPT OF PROCEEDINGS

MARCH 11, 2008

PRELIMINARY INJUNCTION HEARING

VOLUME VIII

BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

APPEARANCES:

For the Plaintiffs: Mr. Drew Edmondson
Attorney General
Mr. Robert Nance
Mr. Daniel Lennington
Ms. Kelly Hunter Burch
Mr. Trevor Hammons
Assistant Attorneys General
313 N.E. 21st Street
Oklahoma City, Oklahoma 73105

Glen R. Dorrough
UNITED STATES COURT REPORTER

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PROCEEDINGS

March 11, 2008

THE COURT: Be seated please. My staff is obviously having fun with me. The defendants may call their first witness.

MR. GEORGE: Your Honor, before we call our witnesses, could I address the Court for just a moment --

THE COURT: Yes, sir.

MR. GEORGE: -- with regard to scheduling? I wanted

Q. "Mr. Littlefield, my name is John Elrod and I represent Simmons Foods in this matter, and I'm going to have a few questions for you. We've not met before today, have we, sir?

A. "No, sir.

Q. "And would you tell me what your name and address is for the record?

A. "John L. Littlefield, 38327 South 4370 Road, Adair, Oklahoma 74330."

* * * * *

A. "I was only there about a year when this job came open in 1998 and I started with the Oklahoma Department of Agriculture on a contract."

* * * * *

Q. "For what counties are you responsible?

A. "Counties?

Q. "Yes, sir.

A. "Mayes County, Rogers County, Craig County, Ottawa County, and Delaware County, most of Delaware. There is a strip on the north side of -- or the south side of 412 that I don't have in Delaware County."

* * * * *

Q. "In terms of coverage for the entire Illinois River Watershed on the Oklahoma side, that would be you and David Berry?

A. "That's correct."

* * * * *

Q. "What are your job duties?

A. "Well, I'm a poultry inspector for those counties. I don't know if I said Mayes County or not in that awhile ago."

* * * * *

Q. "How many growers are in the counties you work?

A. "I -- I think I have about 210. 205, 210.

Q. "Of that number, how many have in place phosphorus based animal waste plans?"

* * * * *

A. "To the best of my recollection, they all do. They either have a plan or they have a letter from the NRCS office stating that they will work them up a plan. So they do have something current in their file."

* * * * *

Q. "Do you get to know these people pretty well?

A. "Yes, sir, I do.

Q. "And for the most part are they cooperative with you?

A. "Yes, sir, they are.

Q. "Courteous?

A. "Yes, sir.

Q. "Have you had any problems with any hostility at any time ever?

A. "Starting out, you know, it was a change and farmers are pretty conservative and independent people.

Department of Agriculture?

A. Most of the time it's by the Department of Agriculture.

Q. Now, Mr. Littlefield, based on your familiarity with the operations in your territory, once the poultry waste and litter is removed from a barn, is it used in any further way to grow more poultry?

A. No, not to my knowledge.

Q. And this is an obvious question, but I want to get the answer in the record. Do you have any jurisdiction over poultry growing operations in the state of Arkansas?

A. No, sir.

MR. NANCE: Nothing further, Your Honor.

THE COURT: Redirect.

REDIRECT EXAMINATION

BY MR. ELROD:

Q. Mr. Littlefield, when you are called upon, as I understand it, complaints go from a complainant to the Department of Ag and then back to you for investigation; is that the way it works?

A. Yes, sir.

Q. And after you conduct one of those investigations -- you say most of them are related to odor?

A. Yes, sir.

Q. And after you conduct one of those investigations, in the history of your involvement as a poultry inspector which

IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA and OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT, in his capacity as the TRUSTEE FOR NATURAL RESOURCES FOR THE STATE OF OKLAHOMA,

Plaintiff,

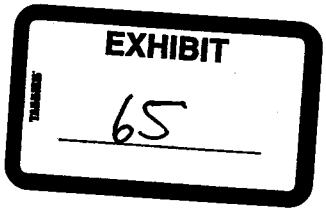
vs. 4:05-CV-00329-TCK-SAJ

TYSON FOODS, INC., et al,

Defendants.

- -

THE VIDEOTAPED DEPOSITION OF TOMMY DANIEL, PhD, produced as a witness on behalf of the Plaintiff in the above styled and numbered cause, taken on the 26th day of November, 2007, in the City of Fayetteville, County of Washington, State of Arkansas, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.



A I met with my dean of agriculture, Mark Cochran, again just to ask for advice.
Q All right. Did you meet with anybody from the poultry integrator defendants that have announced their position today? 09:09AM
A No.
Q All right. Tell the court what is your current employment position.
A I'm employed by the Crop, Soil and Environmental Science Department with the University of Arkansas. 09:09AM
Q How long have you been in that position?
A Since '89.
Q Are you a tenured professor there?
A Yes. 09:10AM
Q Were you at any other position at the University of Arkansas before the crop, soil and environmental area?
A No.
Q Let's talk a little bit about your education starting with where you graduated from high school. 09:10AM
A I graduated from Academy High School in Little River-Academy, Texas. Graduated from A & M in 1963 and University of Wisconsin 1966 and then a PhD from University of Wisconsin in 1972. 09:10AM

Q This was published in '95, the one we are looking at, Exhibit 4.
A Let's take one there. Wilkinson was '79 and '90. I mean these are -- doesn't take a rocket scientist to figure out this is good fertilizer. When you put it out, it's obvious where you put litter and where you haven't. 10:17AM
Q At Page 322 you point out that litter is removed after five grow-outs and that it says currently litter is removed after five grow-outs, which is once a year. Upon removal, this material may be directly land applied or temporarily stored. Let me ask you this: Do you know whether or not once it's removed, that the poultry waste, poultry litter has any use in the growing of the poultry thereafter? 10:18AM
A Not to my knowledge, no.
Q That's in part why it's being spread on the land, is it not?
A Yes. 10:18AM
Q Under the heading land application manure, you talk about except for small amounts of poultry manure used in animal feed, the major portion, greater than 90 percent, is applied to agricultural land. That's the customary practice that I think we 10:19AM

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, ex rel, W. A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA, and OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT, in his capacity as the TRUSTEE FOR NATURAL RESOURCES FOR THE STATE OF OKLAHOMA,	§	
Plaintiff,	§	CASE NO. 05-CV-329-GFK-SAJ
V.	§	
TYSON FOODS, TYSON POULTRY, INC., TYSON CHICKEN, INC., COBB-VANTRESS, INC., AVIAGEN, INC.,CAL-MAINE FOODS, INC., CAL-MAINE FARMS, INC., CARGILL, INC., CARGILL TURKEY PRODUCTS, LLC, GEORGE'S, INC., GEORGE'S FARMS, INC., PETERSON FARMS, INC., SIMMONS FOODS, INC. AND WILLOWBROOK FOODS, INC.	§	
Defendants.		

AFFIDAVIT OF J. BERTON FISHER, Ph.D

The undersigned, J. Berton Fisher, does solemnly swear and state:

1. I am a geochemist and geologist with expertise in the transport and fate of materials in the environment. I hold a Ph.D. and M.S. in Earth Sciences from

EXHIBIT
66

Case Western Reserve University and a B.S. in Geology and Geophysics from Yale University. I am a Certified Professional Geologist, a Registered Professional Geoscientist in the State of Texas and a Registered Professional Geologist in the State of Mississippi. I have published scientific papers regarding technical environmental matters in peer-reviewed publications, and I have given numerous technical presentations regarding environmental matters at scientific meetings. I have worked on the engineering and scientific aspects of numerous environmental litigation, regulatory and transaction matters, including, specifically, environmental matters related to the land disposal of poultry wastes. I have worked professionally as a geochemist and geologist since 1973 and have worked on matters related to agricultural, industrial, petroleum and mining environmental contamination for nearly twenty-five years. My work experience includes consulting, industrial and academic positions. My experience in technical environmental matters includes site investigations, review of site investigation data, analysis of the chemical and physical characteristics of environmental samples, historic research on industrial and agricultural activities and processes, petroleum exploration and production, and mining, the environmental chemistry of organic and inorganic contaminants and studies of the fate and transport of organic and inorganic contaminants in soils, sediments and water, including the collection of undisturbed cores of unconsolidated lake sediment and the geochronological analysis of undisturbed cores of unconsolidated lake sediments using natural and anthropogenic radioactive nuclides and paleontological markers.

Since 1997 I have worked on matters related to the environmental contamination by poultry wastes including the chemistry, generation and land disposal of poultry wastes, the identification of poultry waste constituents in the environment, their fate and transport in the environment, the effects of poultry waste contaminants on water quality, and the management of poultry waste land disposal in eastern Oklahoma and western Arkansas. I have served as a consultant to the Tulsa Metropolitan Utility Authority and the City of Tulsa with respect to poultry waste issues from 1997 to the present.

2. I have been retained by the Oklahoma Attorney General to provide analysis and advice on the fate and transport of land applied poultry waste and to evaluate poultry waste generation and disposal practices.

3. Based on the Census of Agriculture compiled and published by the United States Department of Agriculture, National Agricultural Statistics Service for 2002, Benton County, Arkansas and Washington County, Arkansas (the two counties in Arkansas that overwhelmingly comprise the Arkansas portion of the Illinois River Watershed (IRW)) are listed as having the 3rd (128,066,609 birds) and 4th (109,890,530 birds) largest sales of broilers and other meat type chickens of all 3,078 counties in the United States.

4. Based on published scientific literature and my review of analyses of samples collected of Defendants' waste, the constituents of environmental concern in poultry waste include numerous identifiable constituents including phosphorous, metals and pathogens (i.e. bacteria).

5. Based on published literature, reports made by investigators retained by the Oklahoma Attorney General, records maintained by the Oklahoma Department of Agriculture Food and Forestry, and my direct observation, a significant amount of poultry wastes have been land applied within the IRW by each of the Defendants (Cal Maine, Cargill, Cobb-Vantress, Georges, Peterson Farms, Simmons Foods, Tyson Foods and Willow Brook Foods) employing simple surface application using broadcast spreading equipment.

6. Due to the conditions of terrain, soils and geology existing within the IRW, bacteria, as well as the other constituents of poultry waste that is land applied within the IRW have a propensity to run off the fields on which it is spread to nearby surface water in creeks or streams or infiltrate through the soils and underlying regolith and bedrock and travel to the ground water. Thereafter, these surface and ground waters carrying the waste constituents transport them to larger streams and rivers and ultimately move them to Lake Tenkiller.

7. Based on my review of published scientific literature, aerial photographs, and my personal observations, the following soil and geological conditions within

the IRW demonstrate this propensity of the constituents of land applied poultry waste to readily travel from the fields where land application has occurred to surface and ground water of the IRW:

(a) Surface water movement within the IRW is controlled by its underlying geology. The major streams in the IRW (Illinois River, Flint Creek, Baron Fork and Caney Creek) have developed within geological faults and fractures. These streams flow westerly and southwesterly, and become, in general, progressively more deeply incised as they pass from the Arkansas portion of the IRW to the Oklahoma portion of the IRW. The Arkansas portion of the IRW is dominated by broad open grassed areas of low topographic relief that are dissected by numerous tributary drainages. In the Oklahoma portion of the IRW, topographic relief is greater, and the major streams form broader more steeply-sided forested valleys that separate more isolated grassed areas. Simply stated, the Arkansas portion of the IRW is flatter and more open. This condition facilitates the disposal of poultry wastes through land application. In contrast, the Oklahoma portion of the IRW is generally hillier and thus is less topographically suitable for the disposal of poultry wastes through land application.

(b) The faults and fractures that control drainage within the IRW are primarily associated with the Ozark uplift. The Ozark uplift postdates the deposition of the youngest bedrock (Mississippian) within the IRW. As a result, this uplift disturbed all strata within the IRW. Consequently, significant fracturing and faulting

observed at the surface within the IRW penetrates deeply into all of the geologic formations within the IRW. This deep fracturing is significant, because its presence means that the constituents from land application of poultry waste can not only easily move into shallow aquifers along dissolution-expanded (karsted) infiltration routes, it can also penetrate to greater depths along the deep seated fractures and faults, and thus threaten deeper aquifers. The terrain of the bulk of the IRW is mantled karst. In mantled karst terrains the dissolution of carbonate units beneath a covering of soil and regolith creates expanded infiltration pathways including, sinkholes, solution expanded fractures, faults and caves. The fracturing and faulting within the IRW, combined with karstification (which enlarges subsurface faults and fractures) produces areas of high permeability, and results in a circumstance in which shallow ground water aquifers are particularly susceptible to impact by surface contamination, including contamination by bacteria, that can readily travel from the soil surface to surface water and ground water during rainfall events. Within such a karst terrain, there is little attenuation (reduction) of contaminants as they move from the land surface into and through the karst aquifer. Thus, land application of poultry waste to the karst terrain of the IRW means that constituents of this waste (including bacteria) travel readily through the soils and underlying geologic media to discharge at and into ground water springs and surface streams throughout the IRW. Further, because of the ready flow of water through a karst terrain of the type present in the IRW, there is strong interaction between surface water flow and ground water flow so that surface waters readily become ground water and ground water readily becomes

surface water. The phenomenon is readily shown by the numerous springs and gaining and losing streams found within the IRW.

(c) Soils within the Illinois River Watershed are formed mostly from the weathering of carbonate rocks, and are of low natural fertility. The soils are typically loams and are often rocky due to the presence of chert fragments. Loam soils are mixtures of sand, silt, clay and organic matter. Depending on the relative proportion of sand, silt and clay, these soils will be susceptible to infiltration or surface runoff. Soils susceptible to run off dominate in the eastern and western portions of the IRW. Soils that are susceptible to infiltration dominate in the central portion of the IRW. Thus, contaminants deposited on the surface within the IRW are prone to runoff from soils in about half of the watershed and are prone to infiltration through soils in the remaining half of the watershed.

(d) The geology and terrain of the IRW allows the constituents of land applied poultry waste (including bacteria) to readily travel from the fields receiving poultry waste into surface and ground water. This fate and transport of the contaminants of land applied poultry waste has been verified by scientific literature on this subject and by analyses of environmental media taken within the IRW. Thus, bacteria present in land disposed poultry waste are transported to surface waters (by runoff during rainfall events) and also infiltrate into ground water within the IRW.

8. There are 3563 ground water wells in the IRW including 1717 wells in the Oklahoma portion of the IRW that are documented by the Oklahoma Water Resources Board. Of the 1717 wells in Oklahoma, 1679, or 98% are registered for "Domestic" use (for drinking and other household purposes). Based on my experience and observations these domestic wells do not employ treatment systems that would eliminate any bacterial hazard. Given the above analysis of the geology and terrain of the IRW, surface water contaminated with land applied poultry waste will readily travel to shallow, and often deep, ground water aquifers.

9. Bacteria and other particulate constituents of land applied poultry waste, as well as soluble constituents of land applied poultry waste, are transported by water from the surfaces of fields where the poultry waste is applied to both surface water and ground water within the IRW. Eventually these poultry waste constituents are transported by the flow of water within the IRW to Lake Tenkiller, a man-made reservoir formed by the damming of the Illinois River by the U. S. Army Corps of Engineers beginning in about 1947 and in full operation by about 1953. If land application of poultry waste continues in the IRW it will continue to cause bacterial and other particulate constituents and soluble constituents from poultry waste to be transported to the surface and ground waters of the IRW.

10. Based on scientific literature, acoustic measurements, analyses of samples, and direct observation, a portion of the sediments and other solids transported by the Illinois River and the other major streams of the IRW to Lake

Tenkiller settle through the water column and accumulate as sediments covering the bottom of Lake Tenkiller. In addition, a portion of the dissolved constituents transported by the Illinois River to Lake Tenkiller are made into solids by biological, biochemical and/or chemical processes, and a portion of these solids also settle through the Lake's water column and accumulate as sediments covering the bottom of Lake Tenkiller. The physical, chemical and biological nature of sediments settling to the bottom of Lake Tenkiller reflect historical conditions and activities concerning land use and land cover within the IRW and the physical, chemical and biological nature of Lake Tenkiller. Thus, the sediments accumulating within Lake Tenkiller reflect the effects of the historical land disposal of poultry waste within the IRW.

11. Based on analyses of undisturbed sediment cores collected from Lake Tenkiller, the sediment concentrations of phosphorus and other contaminants from poultry waste have increased over time within sediments accruing within Lake Tenkiller. The temporal pattern of increased concentrations of phosphorus and other contaminants from poultry waste observed for these undisturbed sediment cores collected from Lake Tenkiller are directly related to the changes (growth) in poultry production within the IRW and do not relate to the pattern of cattle production or human population within the IRW. In other words, increased production of poultry within the IRW over time has caused an increase of poultry contaminants in Lake Tenkiller over time. This indicates a direct relationship between poultry production and water contamination in the IRW and contamination

of the sediments of Lake Tenkiller. On the other hand, no such relationship exists with cattle production or human population in the IRW. Furthermore, this analysis shows that the karst geology and soils of the IRW allow for ready transport of the constituents of land applied poultry waste into the surface water and ground water of the IRW which eventually travel to the water and sediments of Lake Tenkiller.

FURTHER AFFIANT SAYETH NOT.

J. Berton Fisher, Ph. D.

Subscribed and sworn to me by J. Berton Fisher, Ph.D., on the 12th day of November, 2007.

Signature Betty de Jong

Printed Name Betty de Jong

Notary Public, State of Oklahoma, County of Tulsa

BETTY DEJONG NOTARY PUBLIC NO. 99013695 EXPIRES 8-17-11 STATE OF OKLAHOMA TULSA COUNTY

My Commission Expires; 8-17-11

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Case No. 05-cv-329-GKF(PJC)
	)	
TYSON FOODS, INC., et al.,	)	
	)	
Defendants.	)	

DECLARATION OF J. BERTON FISHER, Ph.D.

I, J. Berton Fisher, Ph.D., hereby declare as follows:

A. BACKGROUND

1.

I am a geochemist and geologist with expertise in the transport and fate of materials in the environment. I hold a Ph.D. and M.S. in Earth Sciences from Case Western Reserve University and a B.S. in Geology and Geophysics from Yale University. I am a Certified Professional Geologist, a Registered Professional Geoscientist in the State of Texas and a Registered Professional Geologist in the State of Mississippi. I have published scientific papers regarding technical environmental matters in peer-reviewed publications, and I have given numerous technical presentations regarding environmental matters at scientific meetings. I have worked on the engineering and scientific aspects of numerous environmental litigation, regulatory and transaction matters, including, specifically, environmental matters related to the land disposal of poultry wastes. I have worked professionally as a geochemist and geologist since 1973 and have worked on matters related to agricultural, industrial, petroleum and mining environmental contamination for nearly twenty-five years. My work experience includes consulting, industrial and academic positions. My experience in technical environmental matters includes site investigations, review of site investigation data, analysis of the chemical and physical characteristics of environmental samples, historic research on industrial and agricultural activities and processes, petroleum exploration and production, mining, the environmental chemistry of organic and inorganic contaminants and studies of the fate and transport of organic and inorganic contaminants in soils, sediments and water, including the collection of undisturbed cores of unconsolidated lake sediment and the geochronological analysis of undisturbed cores of unconsolidated lake sediments using natural and anthropogenic radioactive nuclides and paleontological markers.

2.

EXHIBIT 67

Since 1997 I have worked on matters related to the environmental contamination by poultry wastes including the chemistry, generation and land disposal of poultry wastes, the identification of poultry waste constituents in the environment, their fate and transport in the environment, the effects of poultry waste contaminants on water quality, and the management of poultry waste land disposal in eastern Oklahoma and western Arkansas. I have served as a consultant to the Tulsa Metropolitan Utility Authority and the City of Tulsa with respect to poultry waste issues from 1997 to the present.

3.

I was retained by the Oklahoma Attorney General, beginning in 2004, to evaluate, provide analysis regarding and to advise on matters pertaining to poultry waste generation, poultry waste disposal practices and the fate and transport of land applied poultry waste.

B. EXPERT REPORT

4.

On May 15, 2008, I submitted an Expert Report to the Defendants in the above-captioned litigation (attached hereto as Ex. 1). This Expert Report contains statements, findings, analyses and opinions with respect to poultry waste generation, poultry waste disposal practices and the fate and transport of land applied poultry waste in the Illinois River Watershed ("IRW").

5.

In my Expert Report, I find that "[a]t present, nearly all…poultry waste is land disposed near where the waste is generated." (Expert Report, Ex. 1 at 4). This is a true and correct finding. I based this finding in large part on official records produced by the Oklahoma Department of Agriculture, Food and Forestry that identify locations where poultry waste has been land applied in relation to locations where that poultry waste was generated, deposition testimony of fact witnesses and experts and documents produced by the Defendants which show locations where poultry waste has been land applied in the IRW. *Id.* at f.n. 4.

6.

> "The terrain of the bulk of the Illinois River Watershed is mantled karst. …In mantled karst terrains the dissolution of carbonate units beneath a covering of soil and regolith creates expanded infiltration pathways including, sinkholes, solution expanded fractures, faults and caves. The fracturing and faulting within the Illinois River Watershed, combined with karstification (which enlarges subsurface faults and fractures) produces areas of high permeability, and results in a circumstance in which shallow ground water aquifers are particularly susceptible

to impact by surface contamination, including contamination by bacteria, that can readily travel from the soil surface to surface water and ground water during rainfall events.... Within such a karst terrain, there is little attenuation (reduction) of contaminants as they move from the land surface into and through the karst aquifer. Thus, land application of poultry waste to the karst terrain of the Illinois River Watershed means that constituents of this waste (including bacteria) travel readily through the soils and underlying geologic media to discharge at and into ground water springs and surface streams throughout the Illinois River Watershed. Further, because of the ready flow of water through a karst terrain of the type present in the Illinois River Watershed, there is strong interaction between surface water flow and ground water flow so that surface waters readily become ground water and ground water readily becomes surface water. The phenomenon is readily shown by the numerous springs and gaining and losing streams found within the Illinois River Watershed.

Soils within the Illinois River Watershed are formed mostly from the weathering of carbonate rocks, and are of low natural fertility....The soils are typically loams and are often rocky due to the presence of chert fragments. Loam soils are mixtures of sand, silt, clay and organic matter. Depending on the relative proportion of sand, silt and clay, these soils will be susceptible to infiltration or surface runoff....[S]oils more susceptible to run off dominate in the eastern and western portions of the Illinois River Watershed, while soils that are more susceptible to infiltration dominate in the central portion of the Illinois River watershed...Thus, contaminants deposited on the surface within the Illinois River Watershed are prone to runoff from soils in about half of the watershed and are prone to infiltration through soils in the remaining half of the watershed."

(Expert Report, Ex. 1 at 44-6).

I declare under penalty of perjury, under the laws of the United States of America, that the foregoing is true and correct.

Executed on the 5TH day of March, 2009.

J. Berton Fisher, Ph.D.

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, ex rel, W.A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA, et al.	)	
Plaintiffs,	)	
V.	)	No. 05-CV-329-GKF-SAJ
TYSON FOODS, INC., et al.,	)	
Defendants.	)	

REPORTER'S TRANSCRIPT OF PROCEEDINGS

FEBRUARY 20, 2008

PRELIMINARY INJUNCTION HEARING

VOLUME II

BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

APPEARANCES:

For the Plaintiffs: Mr. Drew Edmondson
Attorney General
Mr. Robert Nance
Mr. Daniel Lennington
Ms. Kelly Hunter Burch
Mr. Trevor Hammons
Assistant Attorneys General
313 N.E. 21st Street
Oklahoma City, Oklahoma 73105

Glen R. Dorrough
UNITED STATES COURT REPORTER

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PROCEEDINGS

February 20, 2008

MR. JORGENSEN: Good morning, Your Honor.

THE COURT: Good morning, Mr. Jorgensen.

MR. JORGENSEN: May I start with a housekeeping matter?

THE COURT: You may, sir.

MR. JORGENSEN: When you get sued, it's the usual thing to come to court on hearing day, but the company Willow Brook asked if I would say to you that they're not here.

THE COURT: We got the notice. The notice that they

Q. All right. Well, then let's go through it and see what I've missed here. We have all the Oklahoma data in the first chart which, I think, is similar to what we just saw, is it not?

A. That one is the same, yes.

Q. So the next chart is, in fact, the Illinois River; is that correct?

A. That's correct. So the same ODAFF data were analyzed for just the Illinois River Watershed and similar graphs were produced as to the ones we've just talked about.

Q. And what does it tell us that happens in the Illinois River Watershed?

A. It's a very similar story. I guess the slight exception is that, in fact, waste is disposed of even closer to houses in the IRW than the rest of Oklahoma. So again, approximately 30 percent within a mile, 60 percent within about two miles -- or 67 percent within two miles or so, and 80 percent within approximately 3.6 miles or so.

Q. From the ODAFF records, can you tell when these land applications occurred?

A. Well, some of the ODAFF records do identify the timing of land application. So not all of those records identify timing. For those for which timing could be identified and for which the land application was in the Illinois River Watershed, that analysis was conducted.

Q. And is the last chart in this Exhibit 132 reflective of that analysis?

A. Yes, so Figure 5 identifies the timing of litter onto the land within the IRW based on the ODAFF records between '99 and 2004.

Q. And what is this chart essentially telling us about that application?

A. Well, this shows that the majority of the waste disposal, about 55 percent of waste disposal, occurred between February and May for that time period.

Q. Now, did you also have an opportunity in looking at Rausser and Dicks' declaration prepared for the defendants in this case, if he made or they made any determination about where poultry waste is applied?

A. Yes, the Rausser and Dicks information indicated that all 345,000 tons of poultry waste that was generated in the IRW was applied in the IRW based on their base assumption.

MR. GARREN: One moment. I'll pass the witness, Your Honor.

THE COURT: Cross-examination.

MR. GEORGE: Your Honor, my examination will probably take about 40 minutes. I don't know if that should be factored into an afternoon break, whether you'd rather do it now or later.

MR. GARREN: If I may move for the admission of the

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, ex rel, W.A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA, et al.	)	
Plaintiffs,	)	
V.	)	No. 05-CV-329-GKF-SAJ
TYSON FOODS, INC., et al.,	)	
Defendants.	)	

REPORTER'S TRANSCRIPT OF PROCEEDINGS

FEBRUARY 20, 2008

PRELIMINARY INJUNCTION HEARING

VOLUME II

BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

APPEARANCES:

For the Plaintiffs: Mr. Drew Edmondson
Attorney General
Mr. Robert Nance
Mr. Daniel Lennington
Ms. Kelly Hunter Burch
Mr. Trevor Hammons
Assistant Attorneys General
313 N.E. 21st Street
Oklahoma City, Oklahoma 73105

(APPEARANCES CONTINUED)

For the Cargill Defendants: Mr. Delmar R. Ehrich
Mr. Bruce Jones
Faegre & Benson
90 South 7th Street, Suite 2200
Minneapolis, Minnesota 55402

For the Defendant Simmons Foods: Mr. John Elrod
Ms. Vicki Bronson
Conner & Winters
Attorneys at Law
211 East Dickson Street
Fayetteville, Arkansas 72701

For the Defendant Peterson Farms: Mr. A. Scott McDaniel
Mr. Philip Hixon
Ms. Nicole Longwell
McDaniel Hixon Longwell & Acord PLLC
320 South Boston, Suite 700
Tulsa, Oklahoma 74103

For the George's Defendants: Mr. Woodson Bassett
Mr. James M. Graves
Mr. Paul E. Thompson
The Bassett Law Firm
Post Office Box 3618
Fayetteville, Arkansas 72701

For the Cal-Maine Defendants: Mr. Robert F. Sanders
Young Williams P.A.
P. O. Box 23059
Jackson, Mississippi 39225

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PROCEEDINGS

February 20, 2008

MR. JORGENSEN: Good morning, Your Honor.

THE COURT: Good morning, Mr. Jorgensen.

MR. JORGENSEN: May I start with a housekeeping matter?

THE COURT: You may, sir.

MR. JORGENSEN: When you get sued, it's the usual thing to come to court on hearing day, but the company Willow Brook asked if I would say to you that they're not here.

THE COURT: We got the notice. The notice that they

or so, you'll see materials leaving the watershed and entering Lake Tenkiller in somewhere between two and four days.

Q. Does, in your opinion, bacteria increase every time there is a land application of poultry waste?

A. I'm not sure I understand your question.

Q. I believe there was some questions by Mr. George to you about the increase of cattle and their defecating and it might increase bacteria.

A. Well, bacteria are living things and the cows themselves are active in excreting year round. When the poultry waste is cleaned out, it's cleaned out over a fairly -- mainly during a fairly tight time interval and is dumped on the landscape at that time. And so there's a real difference not only in terms of type of animal, but a real difference in timing of what's happening with the waste because the poultry waste is dumped out beginning in the late, late winter and continuing into the late spring is the bulk of when poultry waste is disposed. And that's coincident with rainy periods within the watershed.

Q. And your contrast to cattle is they're there all year; right?

A. Cow is there all year.

Q. You were asked about the inability to, and then suspension of looking for Campylobacter in wells. Do you remember those questions?

A. Yes.